

for **V**ICTORY ... — Work Harder ... — Stop Waste ... — Buy Bonds

# Contractors and Engineers Monthly

Vol. 40, No. 9

SEPTEMBER, 1943

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## Highlights Of This Issue

### • Year-Round Road Maintenance

The coming winter will present many difficulties to highway officials in the snow belt who are responsible for keeping our highway system open to essential traffic. The solution of some of these problems, and the importance of advance preparation for this work and of preventive maintenance of snow-removal equipment are discussed in this issue, which also contains a description of Virginia's method of securing hot-patch results with a cold pre-mix on its bituminous roads. See pages 1 and 6.

### • Post-War Planning

Our series of articles on planning for post-war construction continues with a discussion of necessary construction in foreign lands after the war is won; of the planned improvements on this country's railroads in the post-war era; and the road work to be done in our National Parks and recreation areas when our efforts can once more be devoted to such peacetime activities. See page 2.

### • Wartime Water Supply

The construction of an earth dam on poor foundation to provide an urgently needed additional water supply for the war-industry and military requirements in the Newport News area of Virginia is described in the third of our series on this unusual water-supply project. See page 2.

### • Care of Electric Tools

Tools are weapons too, and should be carefully conserved. Most contractors and engineers recognize the importance of preventive maintenance of the larger units, but may overlook the care of smaller tools, such as electric drills, hammers, and saws. Detailed suggestions for their proper use and care appear in this issue. See page 18.

### • Flight-Strip Construction

The story of grading, drainage and concrete paving of a new Flight Strip, involving a concrete runway 4,000 feet long and 150 feet wide, paved in twelve strips, is told in text and pictures in this issue. See pages 32 and 33.



Head-on view of a versatile motor patrol equipped with V-plow for winter work on an Iowa county road.

## Licking the Drifts This Coming Winter

**More Essential Than Ever, Snow Removal Depends on Proper Equipment Care And Training of New Men**

(Photo on page 64)

♦ DESPITE drastic restrictions on the use of motor vehicles, there will be more essential highway users this winter than ever before. North, south, east and west, the cars and trucks on the roadways of the nation will be vital to the public welfare and to the successful prosecution of the war. Although there will be a marked decrease in the total volume of highway traffic, city, county and state highway departments must keep the roads cleared of ice and snow so that the men and matériel of war may move freely to their destinations; so that farmers will not be impeded as they transport dairy products and livestock to urban receiving and distributing centers; so that war workers and others in essential civilian pursuits may do their necessary driving without delay by snow blockades.

(Continued on page 30)

## Plant-Mix Streets Laid on Gravel Base At Army Air Field

♦ THE primary roads and secondary, tertiary, and company streets and sidewalks at a large mountain-state air field are all surfaced with 2 inches of plant-mix oil mat on a 6-inch stabilized-gravel base underlaid by a subgrade of 8 inches of selected earth. The primary roads are 24 feet wide with a crown of  $\frac{3}{8}$  inch per foot, 6-foot shoulders of the gravel base, and 18-inch minimum ditches. The secondary streets are 22 feet wide and tertiary streets 16 feet wide with the same crown, 4-foot gravel shoulders, and 18-inch ditches. Company streets are 16 to 20 feet wide with paved shoulders 6 or 8 feet wide, all with  $\frac{3}{8}$  inch per foot crown to the low point, and then the oil-mat paving is continued with a slope of not over  $\frac{1}{2}$  inch per foot to the building line. Under the shoulder and paving to the building line, the stabilized-gravel base is reduced to 3 inches thickness.

### Gravel Base

The specifications for the gravel base required that all gravel pass a 1-inch screen, 70 to 100 per cent pass a  $\frac{3}{4}$ -inch screen, 35 to 65 per cent pass a No. 4 sieve, 50 to 30 per cent pass a No. 40 sieve, and 7 to 15 per cent pass a No. 200 sieve. The actual figures for the gravel used at this field were 100, 74, 54, 31

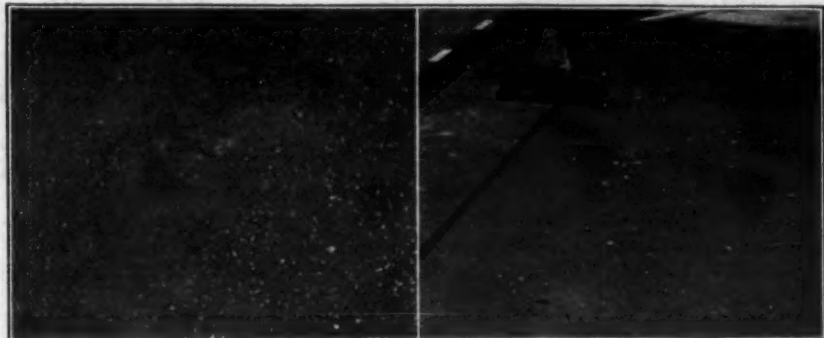
### Oil Mat Laid on Stabilized Gravel Base Primed with MC-1; Used MC-4 for Plant Mix Hauled 11 Miles

and 8 per cent, respectively. The gravel-base material for the 6-inch compacted base was delivered from a crushing plant by a fleet of 4 to 8-ton capacity trucks and mixed and bladed on the road in two 3-inch layers by a Caterpillar No. 12 power grader. The material was watered by a 2,000-gallon tank truck during the spreading, compacted by a pneumatic roller, and allowed to compact further under traffic for fourteen days. A prime coat of MC-1 asphalt was then applied under a pressure of 35 pounds per square inch by a self-propelled asphalt distributor at the rate of 0.33 gallon per square yard and at a temperature of 150 degrees F. A minimum of 24 hours was allowed for the prime coat to cure before any traffic was permitted on the road or street.

### The Plant-Mix

The oil mat was mixed at a plant 11 miles distant from the field for 60 seconds in 3,000-pound batches of the following:

(Concluded on page 23)



C. & E. M. Photos  
Hot-mix for paving the streets at a mountain-state air field was delivered by truck, dumped on the gravel base in piles of about 1 ton per 9 square yards of road surface, and spread by a Caterpillar No. 11 power grader, as shown in the lower photos. Top left, the primed gravel base and, right, the junction of the prime (at right) and base already laid.

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# Post-War Construction

## Much Work To Be Done in Foreign Countries; Plans of U. S. Railroads; Recreation Areas

### Giant Task of Rebuilding World Will Require U. S. Aid; Latin America Offers Large Equipment Market

† FOREIGN construction in the post-war years will boom, due to the necessity for rehabilitation, the reconstruction of devastated areas, and the stimulus for further development in the less advanced countries resulting from the war, and will be carried on in three major categories: 1. the bombed and devastated areas of Great Britain and Europe; 2. the reconstruction and further development of other United Nations; 3. Latin America.

The United States will play an important part in this program. As stated in the initial article of this series on Post-War Planning (C. & E. M., April, 1943, page 4), this nation will be called upon to aid these countries with money, equipment, and materials to begin their reconstruction programs, but this assistance must be regarded as a kind of economic blood transfusion which will contribute to the regaining of the strength of those countries until such time as they are able to carry on for themselves.

#### European Construction

Great Britain's unemployment problem has been practically solved as a result of the demolition and destruction by the Luftwaffe, and her own awakening to the social and economic needs of her people. Both public and private construction will boom for many years to rebuild and catch up with the necessary work deferred during her tremendous war effort. Great Britain is an industrial nation and, as before the war, will presumably continue and perhaps increase her own production of the equipment and materials necessary for her great reconstruction program.

Practically the entire continent of Europe will be faced with gigantic programs of reconstruction of the areas which in many cases will have been wiped out completely by the fury of either the German or Allied air attacks. In most of these countries, money, equipment, and materials must come from outside sources, very likely through a continuation of the Lend-Lease program, during the first period of reestablishment as free self-governing countries and of economic readjustment. It is entirely possible, and in fact probable, that these countries will also need the help of engineers and construction men during that period. After years of oppression, persecution, and starvation, during which many of their trained peo-

(Continued on page 20)



Acme Newspictures, Inc.

Typical of many communities all over the world is this scene of bomb wreckage being cleared from the streets of ruined Pantelleria by Army Engineers with a D4 and bulldozer. Such devastation will call for a giant reconstruction program after the war.

### Post-War Improvements In RR Lines Anticipated; Little to Report in Way Of Planned Construction

† THE railroads of the United States which have performed such a marvel of transportation since our entry into the war look forward with some qualms to the post-war years, according to most of their spokesmen. The railroads today are doing the greatest hauling job in history—munitions, food, necessary civilian goods, troops on duty and on leave or furlough, soldiers' wives and children, mothers and sweethearts, necessary and increased business travel, and still a large, though dwindling, volume of those who travel just "to get away from

(Continued on page 36)

### Planned Program Needed To Provide for Play and Rest Areas Convenient to Centers of Population

† IN the post-war world we shall probably pay more attention to the creation of recreational facilities, as the war has increased the acceptance of plans for the general improvement of social conditions which had started in pre-war days. This means more parks within cities to provide breathing spaces for those living in our crowded urban areas, more parks outside of cities where there is a greater opportunity for spreading out, the small roadside parks of our state highway departments, the larger parks of historical and conservation commissions, and over all, our great system of National Parks, which will again become the mecca of motor tourists. When all of these recreational outlets are considered, we find a truly large volume of construction to be consummated.

When we were robbed of rubber by the Japs and gasoline went to war, the greatest cut in the use of automobiles came out of recreational travel. In the period before the war it was estimated that about 45 per cent of the car mileage went into trips for amusement, recreation, and social purposes.

#### City, County, and State Parks

In a discussion of the need for recreational facilities in rural areas recently issued under the title, "The Park and Recreational Problem in the United States," by the National Park Service, the needs were indicated as follows:

1. Holiday and week-end recreational areas for residents of urban and densely populated rural areas, located within 25 miles of those for whom they are pro-



C.I.A.A. Photo

Construction in foreign lands presents an expanded market for American equipment in the post-war period. Here, fill for a highway in Brazil is being placed by something less than modern methods.

vided, and similar areas, probably more widely spaced, for residents of more sparsely populated rural areas.

2. Extensive public holdings in all those parts of the country characterized by forests, rugged terrain, lakes and streams, for vacation use by both urban and rural residents, and located wherever possible within 200 miles of the urban centers to be served.

3. Public holdings of an adequate portion of the shores of oceans, lakes, and major streams to provide recreational opportunities for those who live within reach of them.

4. Public ownership and administration of all areas of outstanding natural scenery, or outstanding historic, prehistoric, or scientific significance, for the recreational use of all of the people.

5. Special recreational areas, such as parkways, trailways, routes of recreational water travel, and wayside resting places along the major highways.

In the municipal field we already have evidence that cities are recreation-minded in their post-war plans. New York City having instituted a project to cost \$253,000 for an ice-skating rink in Central Park and improvements in Pelham Bay Park in the Bronx to cost \$1,072,550. Detroit, Mich., has a post-war project totaling \$881,500 for exhibit structures at its zoological park on Ten-Mile Road and for improvements on its well-known Belle Isle. In addition, Detroit plans to undertake other park improvements totaling \$11,613,170, which includes the construction of eleven community recreation buildings totaling \$2,750,000. St. Louis is planning to seek Federal and state aid for the financing of a \$5,582,400 program of park improvements and extensions, including the rehabilitation of buildings, swimming pools, new structures, playgrounds, and tennis courts.

(Concluded on page 12)

## An Earth Dam Built On Poor Foundation

### Emergency Makes Necessary Completion of Low-Head Dam on Sand Foundation For Camp Peary, Va.

† IN order to impound an additional 1,500,000,000 gallons of water to supply the rapidly increasing demands in the area served by the Newport News, Va., Water Commission, and those of the military establishments in the peninsular area of Virginia, an earth dam of unusual character has been built across Queen Creek near Magruder, Va. This supply will make possible an increase in

capacity of the 32-mile Lock Joint concrete pipe line from the Chickahominy River to Newport News. (See CONTRACTORS AND ENGINEERS MONTHLY, July, 1943, page 1.) Only one site was available to meet the needs of speedy construction and that provided a somewhat unsatisfactory foundation of a pervious sand with a stratum of muck in the top 20 feet. However, the head is not high, the slopes of the dam are flat and a generous clay blanket is provided, so no serious difficulties are anticipated.

The contract for this dam, known as Waller Dam, including the clearing of approximately 600 acres of land, construction of a concrete spillway, and installation of a 34-inch concrete pipe line outlet through the dam, was awarded to Michael Pontarelli & Sons of Chicago, Ill., on a cost-plus-a-fixed-fee basis. The existing road from Williamsburg to Magruder is to be relocated and will cross Queen Creek on top of the dam.

#### Design of Dam

The top of the dam, at Elev. 42, is 30 feet wide with a 20-foot gravel-surfaced roadway. The upstream face of the dam has a 1 on 2½ slope from the top down to Elev. 38, then 1 on 6¼ to the toe of the dam at Elev. 5.5. The downstream face is the same except that there is a 5-foot berm with a 12-inch channel drain pipe at Elev. 25.

(Concluded on page 39)



C. & E. M. Photo

Stripping the foundation of Waller Dam with a Northwest pullshovel loading to a fleet of Athey 16-yard crawler wagons.



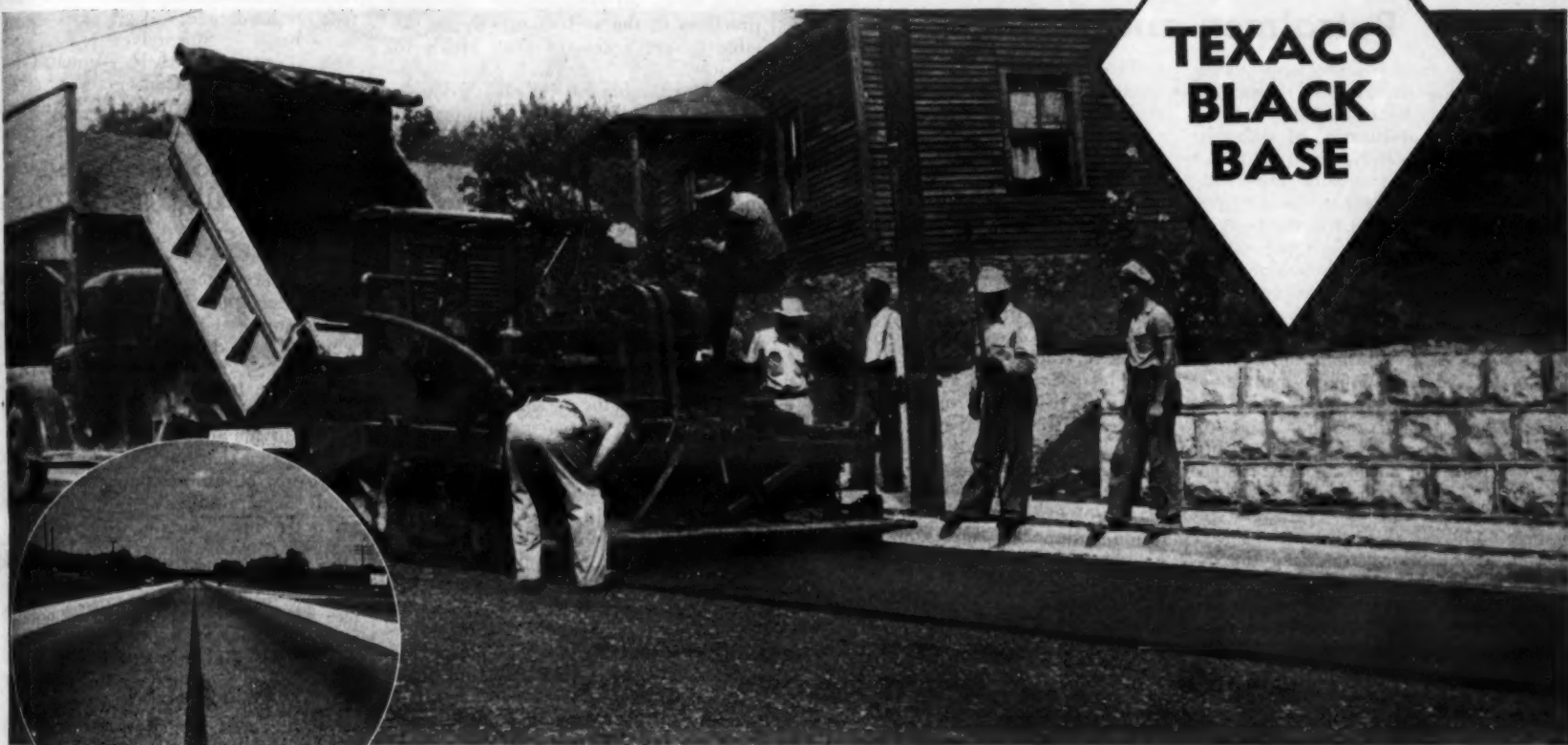
C. & E. M. Photo

An Insley 1-yard bottom-dump bucket delivering concrete to the invert of the concrete arch tunnel through Waller Dam in Virginia.

# Your post-war road or street program

A series of advertisements pointing out  
how TEXACO Asphaltic products  
can fit into your program

#6  
**TEXACO  
BLACK  
BASE**



(Large photo) A 3½-inch TEXACO Asphaltic Concrete foundation (Black Base) and 1½-inch TEXACO Asphaltic Concrete surface give this Paris, Ky., street 5 inches of resilient, durable paving. (Small photo) 25-mile section of State Highway in Bexar-Kendall Counties, Texas, served by TEXACO Black Base.

Years ago, some road builder referred to an Asphalt foundation as Black Base, and the name has stuck ever since. Black Base consists of coarse graded aggregate bound together by Asphalt Cement.

While TEXACO Asphalt wearing surfaces give years of economical service on all foundations, a TEXACO surface on Black Base has advantages no engineer can overlook.

TEXACO Black Base requires no curing period. It cools quickly to air temperature and is then ready for the surface. This speeds construction . . . opens the street, highway or airport to traffic days ahead of a pavement which must be cured.

The same equipment used to mix and construct Black Base is used to mix and construct the Asphalt wearing surface.

A perfect bond forms between Black Base and

Asphalt wearing surface, producing a well-knit, resilient structure from top to bottom.

Because TEXACO Black Base is flexible, it maintains contact with the subgrade, insuring permanent subgrade support. That's why the combined thickness of Black Base and Asphalt surface needed is less than the required thickness of a rigid type of construction, resulting in a proportionately lower cost.

The most common type of TEXACO Black Base is plant-mixed Asphaltic Concrete. However, Asphalt Macadam constructed by the penetration method also is used with excellent results.

Include TEXACO Black Base in your plans for post-war street, highway or airport construction. To help you with such plans, a TEXACO Engineer who specializes in Asphalt construction is at your service.



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# Contractors and Engineers Monthly

THE NATIONAL BUSINESS PAPER FOR CIVIL ENGINEERING  
CONTRACTORS AND HIGHWAY ENGINEERS AND COMMISSIONERS

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\* On leave of absence for military duty.

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## Patrolmen and Politics

Of late we have had too many examples of the loss of efficient highway department heads because of a change in the political administration of a state or county. Unfortunately, the two major political parties sin equally when fully entrenched in power for too long a time, so that a change of heart in the body of voters is often advantageous in breaking up, from time to time, those unhealthy practices which have become associated with, but which are not a necessary part of, democratic government. There are, however, in each state and county, certain service organizations, the personnel of which must be made up, for effective and efficient work, of trained and experienced men and women who should be chosen on the basis of their competency for a specific post, not for their political views.

The highway department is such a service organization, protecting the investment of public funds in the major transportation system of the community. It serves every race and creed, and every shade of political thought, and therefore should be above political patronage and control.

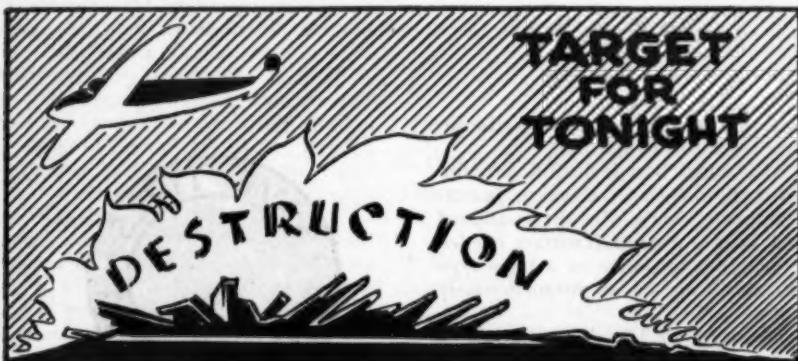
Not long ago we observed an interesting comparison of two highway pa-

trolmen which has some bearing on this question. Both men receive the same pay and do the same work, operating drags over long sections of gravel roads. Each has identical equipment assigned to him which he operates on the section for which he is responsible. No. 1 patrolman is good, he sticks to his job, his patrol section of gravel road is always in good condition, but he was worn out one tractor, that is, it required new sleeves, because he works his equipment constantly.

No. 2 patrolman is a mighty good mixer, he stops whenever he sees a farmer in his cornfield, or a housewife in her yard, and discusses crops, weather, and the health of man and stock. He is very well liked, and there is never a word of complaint registered against this amiable public servant in spite of the fact that his patrol section is in abominable condition, with pot-holes, ruts, and excessive washboard. His tractor is as good as new.

No. 1 is a civil servant, a valuable member of the highway organization and a credit to the community. No. 2 is a politician, a wastrel of public and private funds, despite the fact that his tractor is as good as new.

We need more civil servants.



## Soil Conservation Vital Post-War Job

To the Editor  
CONTRACTORS AND ENGINEERS MONTHLY

I have read with interest the copy of "Post-War Planning a 'Must' for Today" and also the article referring to the work of the Soil Conservation Service which appeared in CONTRACTORS AND ENGINEERS MONTHLY. I appreciate your efforts in behalf of soil conservation and wish to express my sincere thanks to you.

Certainly, we must be laying plans now for post-war projects if we hope to be ready at home for those vital years. Soil conservation offers a big field of projects which can employ thousands of men in work of benefit not only to local communities but to the nation as a whole. Due largely to the shortage of man-power, the application of soil conservation to the land is retarded for the duration, although every effort is being made to spread production-conservation practices to the soil as rapidly as possible to get necessary crop yields for the war.

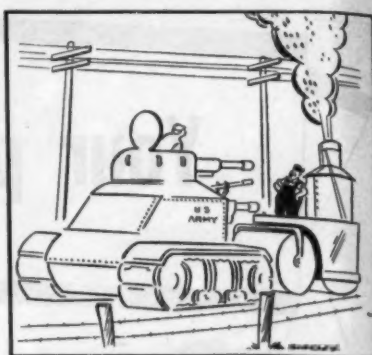
One of the biggest jobs to be done as soon as possible is that of draining some 30,000,000 acres of wet unproductive land. The Soil Conservation Service knows where these acres are situated and also knows what should be done to bring them into productive capacity. Most of this improperly drained land is extremely fertile and could add very materially to our farm production. Prior to the attack on Pearl Harbor, the Soil Conservation Service, through the work of CCC crews, completed drainage projects that benefited 12,000,000 acres. This land is now producing substantial yields of war crops.

Drainage work also helps prevent floods. Conservation practices control and divert excess water run-off from the land. The floods in the middle west this past spring were unnecessary, and could have been greatly reduced, according to results on a number of streams, had there been adequate conservation measures applied to the land of the watersheds.

The application of conservation to the soil—such as installing contour lines, building terraces and earth dams—can employ many men in post-war work. Forty-five states now have laws enabling farmers to organize and operate soil-conservation districts for the mutual benefit of the land. More than 99½ per cent of the total farm land in the nation is in these forty-five states, and a large share of it is potential soil-conservation district territory.

Reports show that the district movement is progressing at a rapid pace. From June 15 to July 15, farmers organized twenty new districts which brought the total in the country up to 907. Within these districts' boundaries are nearly 2,400,000 of the nation's 6,000,000 farms. Conservation plans have been made for only a comparatively small portion of the half billion acres of these farms, and the application of the plans to the land has been completed on an even smaller scale. Farmers are clamouring for technical help to get conservation on their soil and the Service is giving this assistance whenever and wherever facilities and men are available. This will be a great field of constructive employment in the post-war period.

Food not only is vital to military victories but it also is important as an instrument with which to keep the peace. Conservation farming, according to records from farms and test plots, immediately increases production on a general average of at least 20 per cent through higher per-acre yields. And this increased production is sustained year after year because the topsoil is tied down in the fields and the moisture is retained and utilized for added crop growth.



"You heard me! One side with that thing or it goes to the scrap heap!"

War serves to accentuate our love for the good earth. Rationing of food brings home to us the truth that the soil is our source of human sustenance. Productive soil is a precious resource that we must not waste. It is well that we make our post-war plans now and include projects for using the soil in a manner becoming free civilized men.

Sincerely,

H. H. Bennett, Chief,  
Soil Conservation Service,  
Department of Agriculture

## Airport Construction By Small Communities

To the Editor  
CONTRACTORS AND ENGINEERS MONTHLY

I was very much interested in the three articles on post-war aviation and the opportunities it presents to your readers which appeared in the June issue of CONTRACTORS AND ENGINEERS MONTHLY. You are to be congratulated on having presented such a concise and readable survey of the situation.

I feel that there is going to be a wave of airport building in middle-sized and smaller communities as soon as possible after the close of hostilities. Several things will bring this about, but probably one of the most potent factors will be the beginning of feeder airline services which may start at first as nothing more than pick-up and delivery of mail, due to lack of airport facilities in a particular town. As soon as the people of this community begin to feel the effects of more rapid transportation of mail and express, they will want to take advantage of it themselves and I venture to say that a great many will immediately start planning and then building airports. It wouldn't surprise me at all if one of the major activities of certain road-building companies became airport construction.

Also I believe that we will have thousands of Flight Strips developed and we may even see one placed at every important crossroads point in the United States.

Sincerely yours,  
John H. Frederick,  
Professor of Transportation  
and Industry,  
University of Texas

## Brazil to Organize Its Highway System

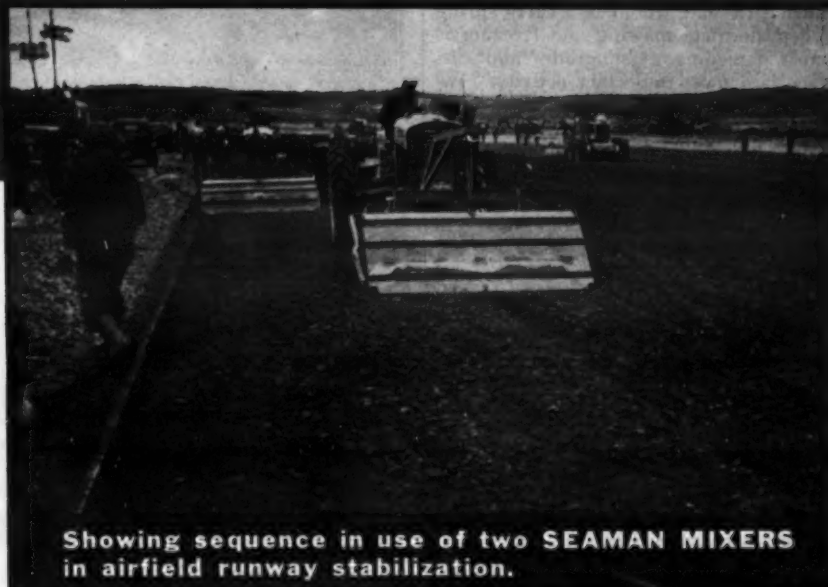
Faced with the need for better internal communications to aid the development of its economic resources, Brazil has taken steps to organize an integrated national highway program. By decree of President Vargas, a commission is being formed to prepare the national program. The commission consists of representatives of the National Highway Department, War Department, Department of Ports and Navigation, National Railroad Department, Reclamation Bureau, and Committee for the Study of State Affairs.

Brazil has need for additional roads into the interior and into the Amazon Basin, where the development of rubber, minerals, and other strategic resources is under way to supply United Nations' war industries and Brazil's own growing needs for raw materials.

# 25,700 SQUARE YARDS OF SOIL-CEMENT PROCESSED IN 10 HOURS WITH

## 2

## SEAMAN PULVI MIXERS



Showing sequence in use of two SEAMAN MIXERS in airfield runway stabilization.

Sorry we aren't permitted to tell you the job on which this phenomenal record was made. Let it suffice to say the scene was a large Air Base; . . . so this astonishing performance is one more important contribution by SEAMAN MOTORS to the all-out war effort.

But we can add this: (and we feel certain you'll agree) — 25,700 square yards of soil-cement in 10 hours — is production that brings a grin of satisfaction, — not to say amazement, — to the contractor and the supervising engineers.

When it is considered that only two SEAMANS were used, — except for the usual small auxiliary equipment, — it is self evident that the performance was record-breaking also in terms of cost of low investment.

We don't say that the SEAMAN MIXER will hit such a figure as this on every job. Sequence of equipment operation must be highly efficient, — materials supply must be perfectly timed and every man must know his job. But 25,700 square yards in 10 hours, — 2570 yards an hour, — means that, even under adverse conditions, the SEAMAN will outperform in speed, thoroughness, mobility and process-control any other equipment used for in-place pulverization or mixing.

And that is true of every type of soil stabilization! Whether specifications call for bituminous, calcium chloride, sand-clay or resin —

**EVERY SOIL STABILIZATION  
JOB NEEDS A SEAMAN!**

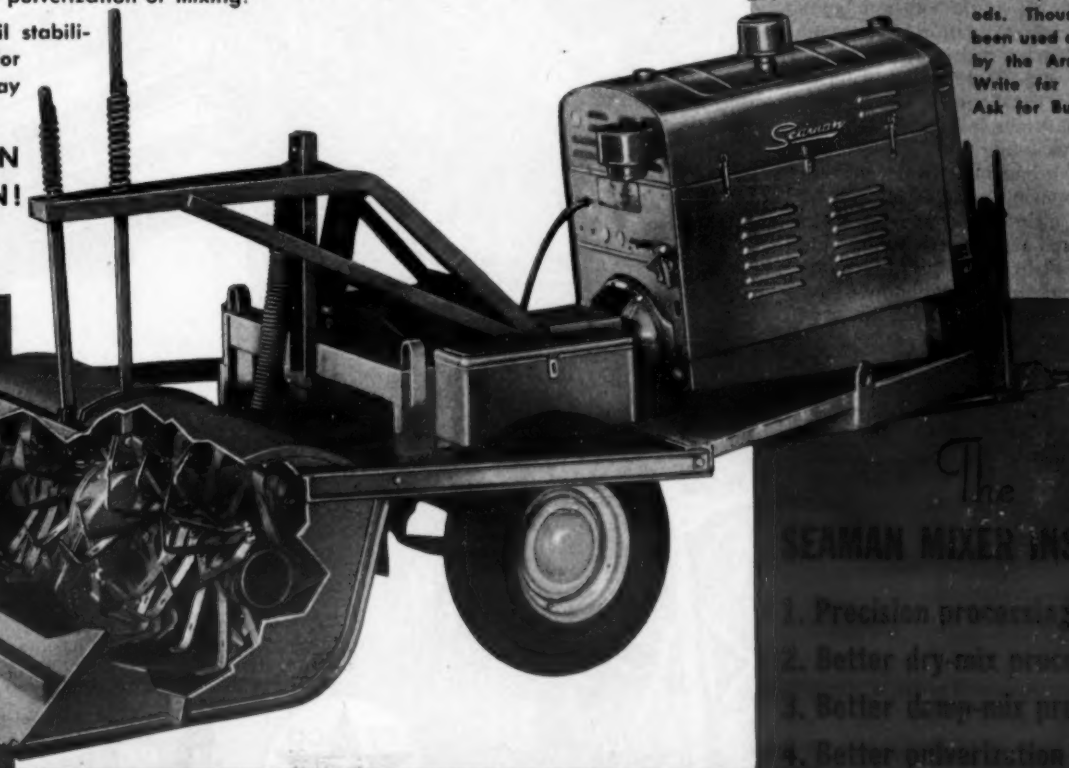


SEAMAN engineers, who have pioneered in soil stabilization processes since the early days, have prepared a detailed, immensely practical handbook on techniques and methods. Thousands have been used as textbooks by the Armed Forces. Write for your copy. Ask for Bulletin E-22.



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by  
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2. Better dry-mix processing
3. Better damp-mix processing
4. Better pulverization
5. Faster production
6. Lower operating cost
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## Hot-Patch Results With Cold Pre-Mix

**Virginia Maintenance Method  
For Salvaging Black Top;  
Rule-of-Thumb Mix Proves  
Effective and Economical**

(Photos on page 64)

† THE protection of black-top roads during the late winter and early spring when alternate thawing and freezing is most damaging to subgrades and surface is a most important activity. We watched the careful patching of a bituminous-concrete road near Providence Forge, Va., by the local maintenance crew of the Virginia Department of Highways, during which each step was taken deliberately in the proper sequence and the resulting patch was clean and workmanlike.

### The Patching Outfit

The maintenance crew consisted of a foreman and two helpers. The foreman drove the Chevrolet truck which was equipped with a Baker body and Wood hydraulic hoist. In the truck body was a small bin of coarse sand, used to cover the patches, 1 cubic yard of hand-made cold pre-mix, and miscellaneous equipment. The pre-mix is made up each day before the crew starts out, using 25 shovels of sand mixed with 5 gallons of RC-3 asphalt.

Miscellaneous equipment in the truck included a hand-pouring pot, a mattock, a pick, three shovels, two brooms, one rake, a straight-edge, and an oil-burning torch with a 20-gallon pressure fuel container. The truck towed a 110-gallon Connery bituminous kettle equipped with a hand pump.

### Making a Patch

One of the laborers cut out the weakened section which was to be patched, using a pick to remove broken pieces and a mattock to cut vertical sides to give a good bearing shoulder for the patch. This was broomed of all loose material and then dried by means of the oil torch.

During this time, the other laborer shoveled out approximately the amount of the cold-patch pre-mix required for holes at that stop, placing the material on a piece of sheet metal and heating it slightly with the oil torch. When the material was sufficiently warmed up, the hole which had been dried out was painted by pouring a small amount of asphalt from a tin can around the edges of the patch and across the bottom. This was heated and fired by the torch until it had covered the entire bottom and sides of the hole, and then the fire was stamped out by means of a shovel.

The hole was then filled with the heated pre-mix material and pounded down and ironed out with a hot shovel so that the patch was flush with the pavement at all sides. On small patches, this was easily checked by eye, but on larger ones the straight-edge was used along the direction of travel to insure smooth riding. The final operation was to seal the patch by hand-casting a small amount of coarse sand over the surface.

### Personnel

We wish to express our appreciation to E. P. Binns, Patrol Foreman working from the Maintenance Depot at Providence Forge, Va., for the information on which this article is based and for the opportunity to take the photographs showing the work. J. J. Forrer is Maintenance Engineer, Virginia Department of Highways, and with L. E. Akers, District Engineer, is responsible for the method of patching used to keep the highways of the Old Dominion State in



C. & E. M. Photo

A typical patching crew and equipment on a Virginia state highway.

repair and serviceable for the duration at the very minimum of cost and expenditure of critical materials.

Back the Attack! Buy War Bonds!

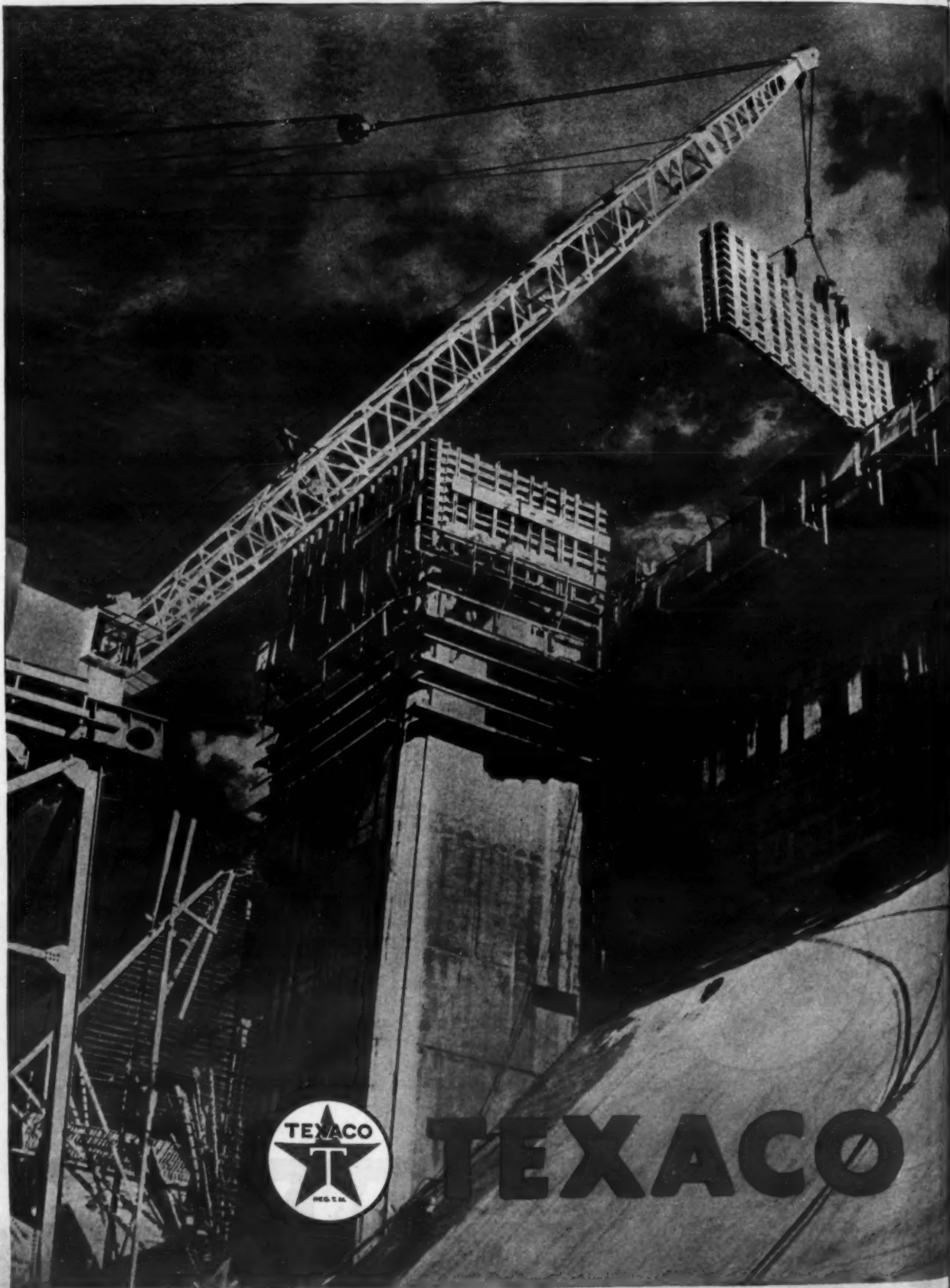
### Construction Equipment On the Fighting Fronts

Allied Army Engineers in the front lines of invading troops are today using

an additional \$75,000,000 worth of tractors, cranes, and other construction machinery as a result of steps taken by the War Production Board to enlist such peacetime equipment in war work, according to a recent report by WPB's Construction Machinery Division.

All types of construction equipment are going into the fight, frequently in advance or support of the foot soldier. Bulldozers, for example, are used extensively to prepare rough paths for the heavy guns and the tractors on which the bulldozers are mounted have on occasion operated as prime movers to haul the guns into position. When airfield runways are bombed, our engineers must have on the spot, when they need them, crawler tractors, cranes, shovels, graders, bituminous and concrete machinery, and jaw and roll crushers.

When artillery-shattered streets have to be cleared to permit the passage of vehicles, temporary or new bridges built, emergency dockage and unloading facilities set up, peacetime construction equipment plays a vital part in the war.

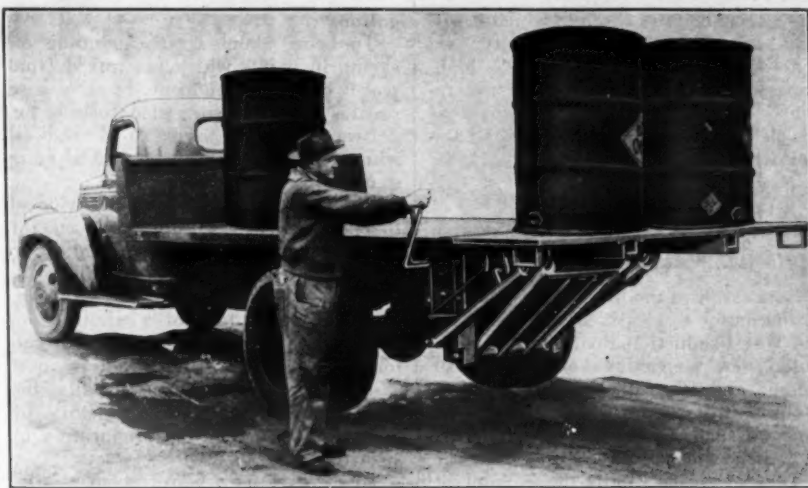


TEXACO

## New Tail-Gate Device Aids Truck Loading

A new hydraulically operated Tail-gate Loader has been announced by Anthony Co., Streator, Ill., manufacturer of hydraulic hoists and bodies. This new mechanism makes it possible for one man to load or unload drums and heavy crates from flat-bed trucks, where several men were formerly required for this type of work.

The device is a steel-reinforced wooden tail-gate, which may be used conventionally at the back of the truck. To load the truck, the gate is dropped to horizontal position and then lowered to ground level and the material placed on it. A powerful 5-inch hydraulic cylinder moves the tail-gate and a load of from 750 to 1,500 pounds, according to the size of the model, from ground level to a position even with the truck from which the load is easily pushed or rolled into the bed of the truck. The mechanism complete with all fittings weighs only 670 pounds. This piece of equipment not



Method of operating the new Anthony Tailgate Loader.

only saves manpower but cuts loading and unloading time, reduces personnel accidents and possible damage to the materials being handled.

Descriptive literature on this new tail-

gate mechanism for loading trucks may be secured direct from the manufacturer by interested contractors and state and county highway department engineers mentioning this magazine.

## Bridge Deck Belies Its Substructures

Unusual Structure Over Crow Creek, Cheyenne, Wyo. The Result of Widening of U. S. 30 Through the City

(Photos on page 64)

AS one drives west on U. S. 30 from the heart of Cheyenne, Wyoming, famed for its annual Frontier Days, as well as being the capital city of the state, Crow Creek is crossed on a wide bridge with simple yet sturdy and attractive pipe hand-rails, two 5-foot sidewalks, and a 54-foot roadway. Even the most hard-bitten bridge engineer would never guess what he is crossing or how it was supported.

Crow Creek Bridge, originally designed by J. E. Seiler and built in 1927, was 140 feet long, carried a 27-foot roadway, and had no sidewalks. Development of the section west of the Creek for both residential and commercial purposes increased pedestrian traffic so much that in 1937 it was deemed advisable to build a 140-foot pedestrian bridge of plate-girder construction on the north side of the highway bridge but entirely separate from the other structure. It carried a 5-foot sidewalk.

In 1941, after the roadway of U. S. 30 had been widened on either side of the bridge to 54 feet, it became essential for safety to widen the bridge. After considering various methods, the Bridge Department took the bull by the horns in good old Frontier-Days style and the result is the attractive superstructure in service today and the unusual substructure. The plate-girder pedestrian bridge was moved 10 feet north and a 10-foot wide creosoted pile-bent section, of two bents, was inserted the full length of the bridge, and another 18 feet wide built along the south side after the cantilevers holding the bridge rail had been removed. The whole structure was then redecked with creosoted timber and the two 5-foot sidewalks built, incorporating the old pedestrian bridge into the new structure. The sidewalks are separated from the roadway in the new bridge by concrete curbs and hub guards. The curbs are 18 inches high and the curb guards on the roadway sides are 9 inches high. At the ends of the curbs are three reflector disks to warn traffic of the limits of the roadway.

A new oil-mat surface covers the entire roadway area of the bridge and also the south sidewalk area. The north sidewalk is part concrete over the old pedestrian-bridge section. The abutments of the widening sections of the bridge are of creosoted wood, as are the stringers for the inserted sections. A heavy 4½-inch diameter pipe rail is placed at the outside of the sidewalk on each side of the bridge.

### Ready-Mixed-Concrete

#### Truck Rental Service

A nation-wide complete ready-mixed-concrete truck rental service, equipped to handle any type of job, large or small, is offered by Conserco, Inc., 1600 South Capitol St., Washington, D. C. The Conserco 7-point service plan provides 3, 4 or 5-yard truck mixers, experienced drivers, gasoline, oil, maintenance of the truck-mixer units, insurance, and the trucks delivered to the job.

In these days of limited equipment and no possibility of adding to your present units, regardless of job requirements, this Conserco service offers a solution to the concrete production and delivery problem anywhere in this country. For further information with rates, write direct to the company.

# PROTECT your Wire Ropes

SWINGING this huge concrete form into place typifies the vital importance of protecting wire ropes against excessive wear and corrosion.

Not only in the building of giant dams, but in all work involving the use of cranes, derricks, hoists, shovels, drag lines, etc., operators everywhere are protecting their wire rope by lubricating it with *Texaco Crater*.

*Texaco Crater* penetrates to the very core, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, rust and corrosion.

So effective have Texaco lubricants proved in increasing output that they are definitely preferred in the several important fields listed at the right.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

### THEY PREFER TEXACO

- ★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.
- ★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.
- ★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.
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# CRATER

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EVERY SUNDAY NIGHT—CBS

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HELP WIN THE WAR BY  
RETURNING EMPTY DRUMS PROMPTLY

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A Whiteman Model T tractor-type rodding machine.

### New Tractor Screed For Concrete Slabs

In addition to its Model '42 hand-operated rodding or screeding machine for concrete floors, the Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles 26, Calif., is now making the Whiteman Model T tractor-type rodding machine for use on concrete runways and pavement slabs. Extensive tests of this machine made during the past six months have showed its adaptability for airport ramps and runways and particularly for highways, the manufacturer reports.

The unit, which weighs approximately 750 pounds, is propelled and steered by large tractor wheels, having a clutch to disengage these wheels from the drive so that it may easily move around. Small wheels on each end of the rodder or screed are set down to carry the weight of the machine when it is moved, and are also used to relieve the weight on an extra wide span by adjusting the wheels to lift slightly to the degree necessary to maintain the proper level.

Due to restrictions under Order L-192, it is necessary to produce the unit with steel tractor wheels having cast iron lugs and with wood tires on the smaller wheels, instead of the rubber tires shown in the photograph. However, the manufacturer suggests that it is possible to substitute available wheelbarrow wheels and tires for the small wheels and, if desired, regular used truck tires could be used to replace the large wheels, by welding standard 16-inch rims on the large wheels.

Complete information on this new Whiteman Model T tractor-type rodding machine may be secured by interested highway and airport contractors and state and county highway engineers direct from the manufacturer or local distributor. Just mention this item.

### New Paraguay Road

An arterial highway from Asuncion, Paraguay, through the southwestern section of the country has been planned, at a cost of \$2,000,000, to develop the cat-

tle-grazing country through which it will pass, according to a recent report from the Department of Commerce. A highway from Asuncion to Villarrica recently completed has opened up areas which previously had no adequate communication with the capital city.

### Meeting Oil Shortage In Outside Painting

As a result of the increasing shortages in the nation's reserves of fats and oils, the War Production Board recently imposed new restrictions on the use of linseed and other drying oils in paints for non-military purposes. The restrictions, issued as Conservation Order M-332, became effective July 1, 1943.

The new order limits the amount of oil that may be used per gallon of paint in the manufacture of ten different classes of interior and exterior finishes. The limitation in the case of exterior house paints and interior and exterior structural steel finishes is 3.75 pounds per

gallon.

To bring about a corresponding oil saving in paints which are mixed from paste or dried pigment by the user on the job, the order also forbids the delivery, to such users, of linseed oil which has a non-volatile content of more than 75 per cent by weight.

This latter provision means in effect that henceforth any oil produced for thinning pastes to paint will contain no more than approximately two-thirds oil, with the remainder volatile thinner. When used in place of a wholly non-volatile drying oil on a gallon-for-gallon basis, it will bring about in most cases an oil saving substantially the same as that made at the factory by the manufacturer in the preparation of a ready-mixed paint.

To meet the new Government regulation, National Lead Co., Room 1815, 111 Broadway, New York 6, N. Y., has developed and is now marketing a new product, Dutch Boy Linseed Replacement Oil, for thinning Dutch Boy paste white lead or for making paint

from dry red lead. Available in 1-gallon, 5-gallon and larger containers, this new product not only complies with the WPB requirements regarding the non-volatile content of oil to be used for mixing paints on the job, but it also conforms to the more specific requirements of Federal Specification TT-0-371 covering linseed-replacement oil for thinning paints or oil pastes. This specification is designed to insure procurement of a replacement oil made from the highest-quality ingredients which will closely resemble straight raw linseed oil. Oils acceptable under the specification must meet rigid standards as to color, viscosity, drying speed, and non-reactivity with pigments.

A series of formulas for thinning paste white lead and red lead, using Dutch Boy Linseed Replacement Oil, and other information on the mixing of paint for wood and metal coverage are found in The Dutch Boy Quarterly, Volume 21, No. 2, 1943, which may be secured from the manufacturer by mentioning this review.

# UP, UP, just a bit higher— with MOTO-CRANE

75' BOOM

95' BOOM

145' BOOM

**W**HEN Jack climbed up the beamstalk, he had no modern equipment to help him. Today it's a different story, and when progressive contractors like Vogt & Conant, Cleveland, Ohio, were called upon to erect 150' high line cable towers across the Niagara River, they used a mechanized Lorain Moto-Crane to do the job. Here's how they did it.

After building a one-half mile road into the middle of the river, the Moto-Crane (traveling on its 10 rubber-tired wheels) carried 11½ ton wood cribs (suspended on the boom) to the end of the road where they were sunk into the

river to form a small island. Then starting with a 60-foot boom and a 15-foot jib extension, and by gradually lengthening the boom to 95', then to 145', they erected the steel tower to the desired 150-foot height. Some of the operations at this point called for working at a 68-foot radius and also for traveling around all 4 sides of the tower. This was accomplished even when the 145-foot boom was in place.

It's performance like this that makes the mechanized, fully mobile Moto-Crane the favorite of contractors on the toughest jobs. Post-war construction will require the use of more cost-cutting, time-saving equipment like the modern Moto-Crane. Why not see your Lorain distributor for complete information soon. The Thew Shovel Company, Lorain, Ohio.

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CRANES • SHOVELS • DRAGLINES • MOTO-CRANES



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**STANDING ROOM ONLY  
FOR DURATION**

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**BEEBE BROS.**  
2724 6th Ave., So., Seattle 4, Wash.

# Improvement Program On Missouri-U. S. 40

## Columbia-Boonville Section For 26 Miles Straightened Through Hills; Two-Lane Construction After War

MISSOURI set out two years ago to improve the 26 miles of winding road through the hills between Columbia and Boonville on U. S. 40, with plans eventually to double-track the highway when times are more propitious for highway construction. A grading and paving contract for 1.2 miles of 22-foot concrete pavement of 9-7-9-inch section east of Boonville was awarded on April 28, 1941, to Otto W. Knutson of Kansas City, Mo., and the paving subbed to Davis Construction Co. of Boonville, Mo. Because of delays in securing steel to complete the single bridge on the project so that grading could be completed, the paving was seriously delayed even though the steel fabric mats, center steel and expansion joints had been purchased and stocked at the job. Paving actually started September 16, 1942.

### The Grade and Forms

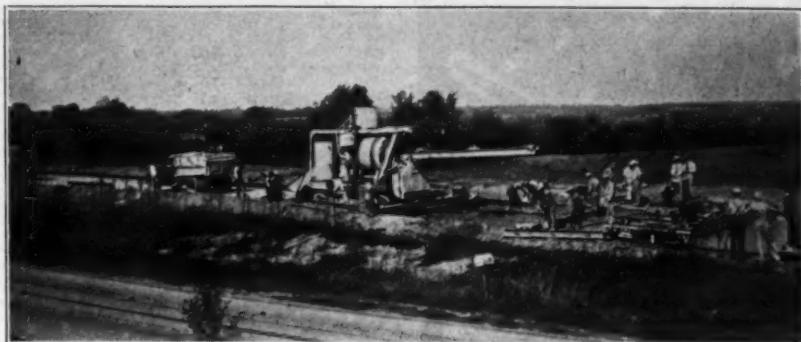
The grade was brought to the proper shape for the forms to be set by using a Caterpillar No. 12 power grader and, for high grade, a Model L tractor and an 8-yard LeTourneau Carryall scraper. The form trench was cut by a Carr Formgrader followed closely by two form setters and two helpers on the Blaw-Knox and Heltzel steel forms. There were 1,400 feet of each for the job. A crew of ten men worked on the trimming of the form trench and the fine grade.

### Batching Stone and Cement

The batching plant was set up about a mile from the end of the job where the contractor's trucks had to cross a railroad track. The aggregates were all brought in by truck, but the bulk cement came in by rail on a spur on the opposite side of the rail line from the batching plant. There were only five 2-batch trucks running as that was the entire supply in the vicinity at the time. This proved sufficient for the job as the haul was not long. In addition, the

men for the labor crews were the result of a very careful combing of the available labor in four counties which had been very well stripped of man-power by the large construction projects in other parts of the state. The extreme youth of some of the workers was noticeable.

The batching plant consisted of two Blaw-Knox single plants, one set up for the two sizes of crushed limestone which were mixed by the clamshell as placed in the bins of the plant, and the other about 200 feet away at right angles to the first and used for sand. A single Koehring crane walked between the two plants and kept the bins filled. The advantage of this set-up was that the trucks wasted no time in picking up their batches. The two plants were available,



C. & E. M. Photo

The Davis paving outfit in action on U. S. 40 between Columbia and Boonville in Missouri.

an important factor in these days, and by using two men for batching the progress was faster than having one green man on a larger plant, and the time lost in backing trucks under the plants was eliminated. After picking up the batches, the trucks crossed the railroad tracks again and drove down a siding for loading the batches of bulk cement.

The trucks had to turn in a restricted drive and back to the depressed roadway, cut under the loading dock of the Johnson KoneKart bulk-cement outfit. Four men unloaded the box cars of cement, two dumping and wheeling, and two loading in the car, and taking turns at the operations. The batches were covered.

(Concluded on page 26)

**HOUGH**  
"HUFF"  
Tractor Shovels  
and  
Road Sweepers

## Not Ready to Retire?

"WM" Tractors are out of production, so prospective users of Hough Models "WM" and "WMX" Shovels must wait until the manufacture of this class of machinery is again permissible. Meanwhile, owners of this equipment should take full advantage of these profit factors:

- (1) Make broader use of your Hough equipment on new and unusual applications.
- (2) Prolong the useful life of your Hough equipment by proper maintenance and operation. The following suggestions will prove helpful.

Shorten snap chains to increase dumping height on free-dumping material . . . Use special width buckets for rehandling and light materials loading (your dealer has the details) . . . Hardface bucket cutting edges for maximum bucket life . . . Keep cutting edges sharp for bigger loads and faster loading . . . Use counterweights to provide in-



### Practical Extra Uses for Hough Shovels

For bank and slope cutting—For boosting wagon scrapers and trucks—For charging concrete mixers, asphalt plants and black topping machines—For cleaning up inside of forms, trenches, pits and basements—For gondola car loading, using ramp—For setting pipe, culverts and lighting standards—For pulling poles and shoring. Of course, the tractor is available for all normal uses.

creased load capacity on front end . . . Keep hydraulic system clean . . . Use only SAE 10 oil (U. S. Engineers OE10) . . . Lay out your job properly to do as little turning as possible for maximum crawler life . . . Don't turn in soft-going; run straight across the job.

Can we help you with your operating and maintenance problems?

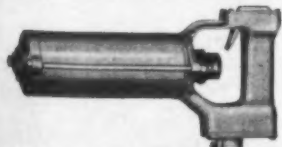
**THE FRANK G. HOUGH CO.**  
• Libertyville, Illinois •

## THE DIFFERENCE BETWEEN THIS and THIS



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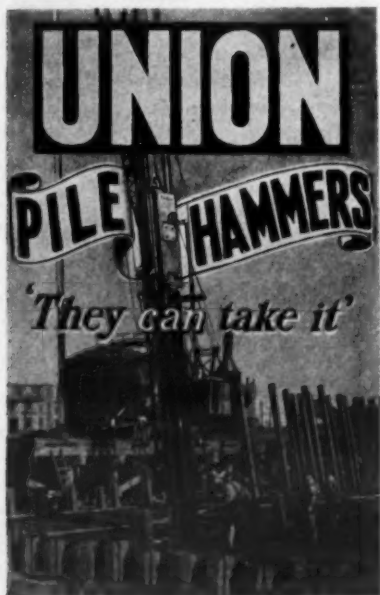
Courtesy, N. I. A. A.

### Road Planning Fund Allocated to States

One of the important sections of the highway bill signed by the President on July 13 is the establishment of a \$50,000,000 highway planning fund from available Federal-Aid funds. Each state may spend for planning an amount equal to that received under an apportionment of \$50,000,000 among the states in accordance with the provisions of Section 21 of the Federal Highway Act. Allocations under these provisions range from a minimum of \$250,000 to a maximum of \$3,252,287, which goes to Texas. New York, Pennsylvania, and California each receive over \$2,000,000, while there are an additional fifteen states in the \$1,000,000 to \$2,000,000 bracket.

The apportionment of this \$50,000,000 planning fund, to be matched by the states, is as follows:

Alabama	1,073,683
Arizona	737,698
Arkansas	879,398
California	2,052,843
Colorado	920,452
Connecticut	318,057
Delaware	250,000
Florida	736,147
Georgia	1,387,986
Idaho	634,020
Illinois	2,020,185
Indiana	1,232,715
Iowa	1,475,186
Kansas	1,293,058
Kentucky	955,360
Louisiana	762,633
Maine	444,348
Maryland	415,242
Massachusetts	670,583
Michigan	1,556,139
Minnesota	1,380,023
Mississippi	919,522



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Pile Driver Leads, Grout Mixer and Ejector, Mine and Shaft Cages, Ships and Buckets, Air Locks, Subaqueous Equipment, Tunnel Shields, Pile Driver Hoists.

EST. 1900  
**Union Iron Works, Inc.**  
ELIZABETH, New Jersey

Missouri	1,519,138
Montana	1,037,280
Nebraska	1,020,507
Nevada	654,359
New Hampshire	250,000
New Jersey	651,596
New Mexico	829,669
New York	2,469,804
North Carolina	1,235,019
North Dakota	765,365
Ohio	1,802,996
Oklahoma	1,162,017
Oregon	849,827
Pennsylvania	2,093,567
Rhode Island	250,000
South Carolina	693,473
South Dakota	804,186
Tennessee	1,086,546
Texas	3,252,287
Utah	576,142
Vermont	250,000
Virginia	936,400
Washington	807,890
West Virginia	563,183
Wisconsin	1,231,947
Wyoming	638,436
Hawaii	250,000
District of Columbia	250,000
Puerto Rico	253,006
Total	\$50,000,000

### More Central Valley Contracts Awarded

Contracts have been awarded for the construction of an 11½-mile section of the Madera Canal of the Central Valley Project, California, by the Bureau of

Reclamation. The completion of these contracts as a wartime emergency measure will considerably increase essential food production.

The work for which contracts have been awarded involves the excavation of 11½ miles of canal and the construction of bridges, syphons, and appurtenant canal structures which have been redesigned to include the absolute minimum of critical materials. An 8½-mile section of the canal, beginning at Friant Dam, is already built. Completion of this schedule will extend the canal to the north bank of the Fresno River, or for about half of its ultimate length.

The completion and placing in operation of the Madera Canal will provide irrigation water for more than 55,000 acres of new land in addition to an assured continuous supply for the 85,000 acres now irrigated. This will mean production of thousands of tons of alfalfa, dry beans, potatoes, cotton lint and seed, and other products can be added to the supply of food and fiber needed during the concluding phase of the war and for

use in foreign lands during the rehabilitation period.

The Interior Department Appropriation Bill, passed by Congress before its recess, carried appropriations of \$1,000,000 for continuing construction on the Madera Canal, \$595,000 for completing Friant Dam to a point permitting storage and diversion of water, \$7,000,000 for beginning construction on the Friant-Kern Canal, and \$1,000,000 for the Contra Costa Canal and laterals. The War Food Administration, in recommendation to the War Production Board, urged construction of these four structures of the Central Valley Project as an important means of increasing the nation's food supply. On May 11, 1943, the War Production Board lifted stop-work orders on Friant Dam and the Madera Canal, but has withheld action on the Contra Costa Canal and laterals pending further study of all proposed irrigation development.

On August 2 the War Production Board declined to approve the construction of the Friant-Kern Canal.



Official U. S. Army Signal Corps Photograph

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needs utmost productive power. For safe lubrication of **CONSTRUCTION** equipment in stepped-up operation use . . .

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These quality motor oils, gear oils and greases protect against wear . . . promote continuous delivery of full designed output from heavily worked machinery.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



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# Few \$\$ Maintain Big Gravel Mileage

**2,500 Miles of Road in Bernalillo County, N. M., For Ranch, Oil and Urban Areas; Little Equipment**

YOU can do a lot with a little if you have to. In proof we offer Bernalillo County, centering about Albuquerque, New Mexico, running 30 miles east into a ranch and oil-well area, and 35 miles west to grazing land. In between are many subdivisions, outside of city limits, which increase the mileage of county roads to over 2,500, of which only 10 miles are black-topped, the balance being all gravelled. The small mileage of surfaced roads is caused not by any lack of desire for such improvements, but by the small budget. The mileage in subdivisions increases annually while the road fund figure has remained static for some years, and now may be seriously reduced.

## Finances

All funds for the county roads come from two sources, 15 per cent of the fees collected by the state for motor-vehicle license plates, and a 1/2-mill tax on real estate. These amount to a total of \$40,900, of which the real-estate tax is only \$12,830. The exceedingly small tax income is due to the fact that New Mexico has a law limiting the taxes that may be levied on real estate to 20 mills. For a period for two or three years prior to the war the county had also been losing some of the income from license fees due to a rather heavy fee for new cars, as a result of which the license income dropped off in amount.

The gross Road Fund of \$40,900 permits an expenditure of only \$16.36 per mile of highway, if it were all spent on maintenance and none on new equipment and the care of old equipment.

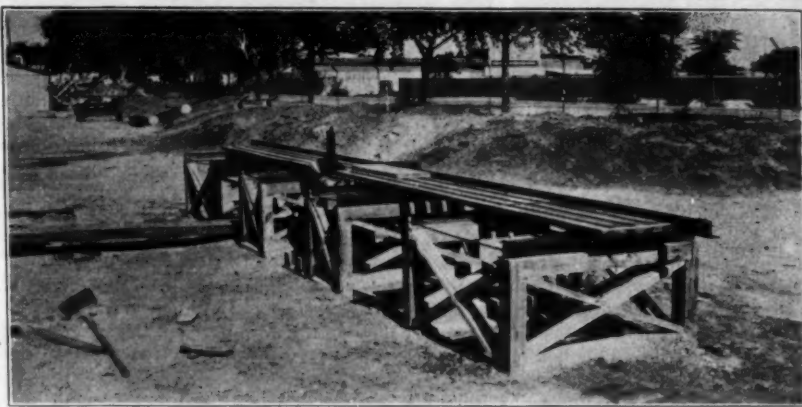
## The Highway Organization

The County Highway Department of Bernalillo County consists of three commissioners, the County Engineer, and the Superintendent of the County Road Department, with about twelve regular employees in the shop, and for operating the equipment. The commissioners are

elected at the same time every two years at large from the county and they appoint the County Engineer who is usually the County Surveyor, an elective office. The Road Superintendent is appointed for a two-year term. The present incumbent, Gordon Winter, has been with the County Highway Department for 11 years, and for the last 9 years has held the post of Road Superintendent.

## Operating Methods

The operation of a county road department for a county that is 65 miles long and 25 miles wide and with half its area in the mountains offers certain problems. The county roads are generally 20 feet wide on a 50-foot right-of-way, and the black top is laid 22 feet



C. & E. M. Photo  
The ingenious bed for cutting bridge timber set up in the Bernalillo County, N. M., Road Department yard adjacent to the timber rack.

wide. The best roads, for the heaviest traffic, are 30 feet wide. All the county roads are topped with pit-run gravel of which the county has an abundance. Of the large number of pits owned by the county, and it also leases a few, the

biggest is 7 1/2 acres of gravel at least 30 feet deep. The material runs from portions high in sand to other parts with an excess of coarse material, so that the proper type of aggregate for any par-

(Continued on page 56)

AMERICA'S MOST VERSATILE

# Snow Removal Unit



## BROS ROTARY WIDENER for Highway and Airport Operation!

Swiftly establishing itself in popularity, because it does more snow jobs better and faster, the Bros Rotary Widener is a versatile snow removing machine. Designed for high speed handling of snow, it does the needed jobs for highway and airport maintenance with a saving in time, labor and expense.

**On the Highways:** The Bros Rotary Widener does your most essential job, which is immediate and complete removal of freshly fallen snow from the road, so that you have plenty of space to work the next storm. During cold weather, when the truck can travel safely on the shoulder of the highway, it permits you to clear away the drifts 40 inches from the edge of the shoulder. This gives you insurance against wet, soggy road shoulders when the spring thaw begins. You get sharp, incisive cleaning, right down to the surface with the Bros Rotary Widener.

**On Airports:** You can start with the storm and keep up with it. The Bros Rotary Widener clears a strip up to 18 feet wide with a single pass, using a special long one-way mouldboard plow, and at ex-

ceptionally high speeds. It is the most versatile snow unit for airport maintenance.

**Features:** The driver has complete vision at all times. The rotary unit sets behind the cab and snow is thrown behind the driver. The chute is reversible so that snow can be discharged to either side of the road or runway. The plow throws a constant, concentrated stream of snow—making it possible to obtain good results even in high winds. The rotary unit may be lifted hydraulically, providing adequate ground clearance for safe, speedy travelling. The Bros Rotary Widener is a complete self-contained unit and may be removed easily and quickly from the truck. The front plow may be dropped at any time, making the truck instantly available for other front end equipment. Complete details on the Bros Rotary Widener—America's most versatile snow removal unit—will be sent upon request.

ROAD MACHINERY DIVISION

WM. BROS BOILER & MFG. CO.  
Minneapolis, Minnesota

# BROS WIDENER



**GREATER POWER  
EASIER HANDLING  
LONGER LIFE**

**GET THINGS DONE  
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**High-Heat-Resisting  
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## New Post-War Roads In U.S. National Parks

(Continued from page 2)

### Forest Lands—Public and Private

The improvement of forest transportation facilities within both public and private forests may well produce another large post-war construction figure. Most of the highways in our forests are unsurfaced and of the single-lane type with turnouts. Forest trails are designed for horse and foot travel and are useful for administrative travel, fire protection, for range and wild-life management, and recreation.

There are at present 35,000 miles of highways serving public forest land and 148,000 miles of highway serving privately owned forest land, according to the National Resources Planning Board. In public forests there are 117,000 miles of development road and 156,000 miles of horse and foot trails, and in privately owned forests, 400,000 miles of development roads and 157,000 miles of horse and foot trails. Completion of the forest transportation system would require, it is estimated, 8,500 miles of highways, 43,500 miles of development roads, and 52,000 miles of horse and foot trails in public forests; and 3,600 miles of highways, 61,000 miles of development roads, and 107,000 miles of trails in privately owned forests. Much of this work would be done with bulldozer and grader, requiring perhaps a small amount of power-shovel work, but it all mounts up to big figures for grading contractors when Federal and private funds are made available for these operations.

### National Parks and Parkways

There are almost 26,000,000 acres used primarily for recreation and many millions of acres in addition available for recreation as a secondary use. Authorities point out that the principal need is not primarily for more recreational land in the aggregate but for additional recreational lands and recreational facilities in locations easily accessible to the people. Recreational agencies suggest the following program of acquisition and development to provide adequately for recreational needs on rural lands:

1. Local non-urban parks and recreational areas, 150,000 additional acres.
2. State parks and related recreational areas, 4,000,000 additional acres.
3. National parks and park projects, 3,075,000 additional acres.
4. National forests, 1,500,000 additional acres.
5. Shore frontage, 1,500 additional

miles.

6. Parkway, 10,000 additional miles.

The recreational improvements in these areas would include playgrounds and playfields, shelters, bathhouses, cabins, lodges, administration buildings, museums, highways, roads and trails, fire-protection facilities, and sanitary facilities. It is estimated that in order to acquire these recreational land acreages and to develop them properly would cost in the neighborhood of \$4,500,000,000, and would require many years for completion.

In a special statement to **CONTRACTORS AND ENGINEERS MONTHLY**, Newton B. Drury, Director, National Parks Service, states:

"If appropriations are made for parkways, roads, and trails at the end of the war, the National Parks Service could advantageously undertake an annual program of \$7,500,000 for roads and trails and \$10,000,000 for parkway projects. Almost all of such work would consist of completing projects previously undertaken and of surfacing roads al-

ready graded. The bulk of the work is surveyed and planned cooperatively by the National Parks Service and the Public Roads Administration. Surveys and completed plans are on hand for a portion of such programs, but a majority still require surveys and plans.

"Funds for the planning of projects are derived from our construction appropriation. No funds are available at this time, so that, presumably, completion of additional surveys and plans must wait until after the war. If special funds for advance plan preparation should be made available by the Congress, the entire program for the first year could be made ready in a very short time. Approximately 90 per cent of the work on roads and parkways would be done by contract."

### Army-Navy "E" Awards

The following companies have recently received Army-Navy "E" Awards: Austin-Western Road Machinery Co., Aurora, Ill., for a conspicuous job in

turning out various products some of which had never been built before, for making parts and for using old equipment to save the expense of buying new machines; to the Baker Mfg. Co., Springfield, Ill., for excellence in production of bulldozers and other road equipment for the war effort; to the du Pont, Wash., Works of E. I. du Pont de Nemours & Co., for its production of dynamite for lend-lease shipment and of black powder for military purposes; and to Skilaw, Inc., Chicago, Ill., for excellence in production.

### Highway Research Board, AASHO Schedule Meetings

The Twenty-Third Annual Meeting of the Highway Research Board will be held at the Edgewater Beach Hotel, Chicago, Ill., on November 27-30, 1943.

The American Association of State Highway Officials will hold its Annual Meeting at the same hotel, starting December 1 and continuing through December 3, 1943.

**GETTING DOWN TO FINE POINTS**

- 1 Gasoline or Diesel Power
- 2 Compressor Efficiency
- 3 Long Life
- 4 Economical Engine Speed
- 5 Self Starting
- 6 Force Feed Lubrication
- 7 Automatic Controls
- 8 Compact Dimensions
- 9 Light Weight

105 DeLuxe Compressor, with Tool Boxes. Built in sizes ranging from 20 to 420 cu. ft. of actual air delivery in various types of mountings.

Hard hitting, "SKEETER-FAST" performance counts most in today's war-time operations. SCHRAMM compressors are doing their bit in this effort. They are light in weight, meaning that the extra weight that is ordinarily used goes into vital war equipment. Schramms are noted for long life and economical operation—a key essential during this period of material shortages.

Both the engine and the compressor are water-cooled and give the same efficient operation summer and winter with the housing doors off or on. There is no stalling of the engine in zero weather due to excessive oil drag. In other words, SCHRAMM has the fine points that count in getting work out.

**SCHRAMM, INC.**  
THE COMPRESSOR PEOPLE  
WEST CHESTER, PA.

For **20 YEARS**  
**D-A LUBRICATION**  
D-A LUBRICANT CO., Inc.  
INDIANAPOLIS

# Study of Accidents Shows Up Causes of Injuries on Jobs

## Losses in Man-Power and Money Result from Unsafe Practices and Inadequate Maintenance of Equipment

By the Safety and Accident Prevention Branch, Construction Division, Corps of Engineers, U. S. Army

(Photos on page 64)

AS a consequence of accidents involving the use and operation of mechanical equipment, the construction industry of this country has suffered huge losses in man-power and money. This conclusion is based upon a study recently completed by the Safety and Accident Prevention Branch of the Corps of Engineers, U. S. Army, covering military construction and civil works for 1942. This analysis of the accident experience for all construction, river and harbor and flood-control work performed by the Government and by contractors, under the direction of the Corps of Engineers, brought out the following significant points:

1. Only 30 per cent of all injuries involved mechanical equipment, but they produced 42 per cent of the lost time from all accidents and 50 per cent of the fatalities.
2. More than half of all lost time from injuries in equipment accidents involved the use of cranes, draglines, tractors and similar general construction equipment, i. e., 25 per cent of the equipment accidents produced 52 per cent of all the lost time in those injuries.
3. Motor vehicles were involved in 22 per cent of the accidents and produced 34 per cent of the days lost in all injuries involving equipment.
4. In contrast, hand tools comprised 29 per cent of the equipment accidents, but resulted in only 5 per cent of the days lost from those accidents.
5. Miscellaneous equipment was involved in the remaining 25 per cent of the accidents, but produced only 14 per cent of the total days lost.

In view of the fact that general construction equipment was involved in accidents producing 52 per cent of all lost time, this detailed study is confined to the accidents involving tractors, bulldozers, cranes, draglines, railroad locomotives and cars, power shovels, graders, concrete mixers, and similar equipment.

### What Are the Causes?

The great majority of the accidents were caused by inadequate maintenance of equipment, insufficient instruction in safe practices, or lack of insistence on their observance. Unsafe practices were factors in 80 per cent of all injuries. The responsibility for correcting unsafe practices rests primarily with supervisors. Until accident prevention is given consideration equal to production by all supervisors, serious injuries, delays, and damage to equipment from the

same causes will continue to occur.

Concentration on the major accident sources and causes offers the biggest opportunity for reducing serious injuries with the available time and money. The most frequent cause of the general-equipment accidents was failure to watch, warn or signal workers likely to be endangered in backing, turning, swinging buckets, lowering mixer skips, and making similar movements. The elimination of this cause of accidents should receive the most attention.

Eight combinations of unsafe practices and conditions caused 75 per cent of all injuries. Supervisors can, there-



Failure to inspect and properly care for cables on excavators can result in scenes like this, involving a death, costly delay and damage. Care of equipment means safety as well as extended service life.

fore, utilize the time available for accident-prevention work most effectively by devoting the largest share to correcting

these eight hazardous practices and conditions, which are:

(Continued on page 24)

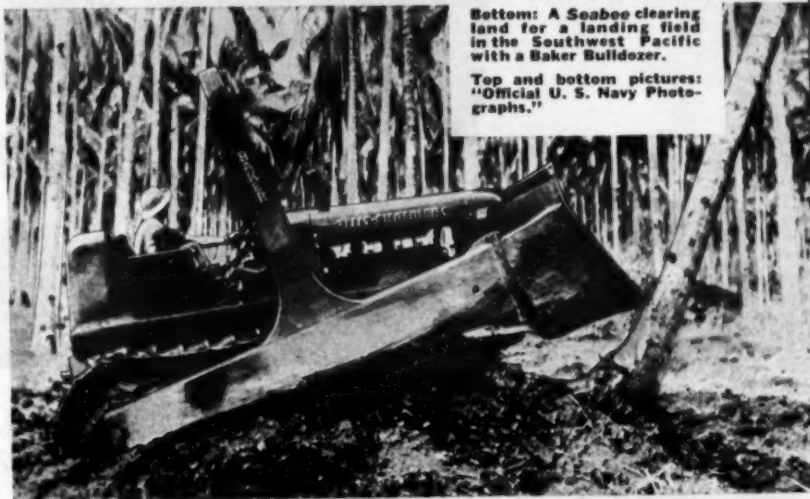


Top: Baker Bulldozer-equipped tractor compacting runway with sheepfoot rollers on a Southwest Pacific Island.

Center: Tree dozing for a landing strip at Guadalcanal with a Baker Bulldozer.

Bottom: A Seabee clearing land for a landing field in the Southwest Pacific with a Baker Bulldozer.

Top and bottom pictures: "Official U. S. Navy Photographs."



## SEABEES USE BAKERS TO BEAT JAPS ON SOUTH PACIFIC ISLANDS

### Tree Dozing, Leveling and Grading Speeded to Completion

Hogging out landing strips and airports on South Pacific islands, despite almost continuous air and land attack, was speeded to completion with Baker Bulldozers and Graders. Seabees, U. S. Engineers and other construction units used these versatile tractor units to hasten many construction jobs.

Tree dozing and jungle clearing, road building, leveling and grading landing strips and air fields—all were taken in stride and speedily finished.

#### Top Brace Is Safety Factor

In jungle dozing, the overhead brace on Bakers was found to be a valuable safety factor as falling palmetto and other trees could not fall on top of the tractor operator. Flexibility of blade lift made tree dozing simple as hydraulic control allowed for inching the blade up the tree trunk for increased leverage pushing after the fall was started.

Hydraulically operated blade control, full down-pressure and smooth lift simplified grading and leveling despite the inexperienced operators, adding to speed of operations and quality of construction.

Bulldozer-equipped tractors were also widely used for pulling sheepfoot rollers and other equipment and for hauling loaded wagons and trailers.

**THE BAKER MFG. CO.**  
585 Stanford Ave.  
SPRINGFIELD, ILLINOIS

# BAKER

The Modern Tractor Equipment Line  
for  
EARTH MOVING  
LEVELING AND GRADE BUILDING  
SNOW REMOVAL  
ROAD MAINTENANCE

## NEED A BIG Trailer?

La Crosse Makes Them  
Up To 200 Ton Capacity—  
•• WRITE OR WIRE ••

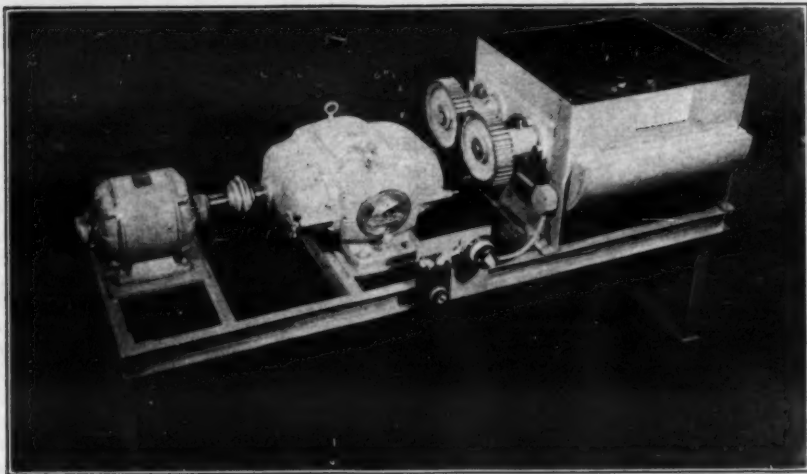
LA CROSSE TRAILER & EQUIPT. CO.  
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The Iroquois twin-shaft laboratory pugmill mixer used by the Testing Division of the Pennsylvania Department of Highways.

### New Road-Mix Tests In Pennsylvania Lab

As a result of the curtailment in the use of asphalt for road construction, the Pennsylvania Department of Highways undertook a research program concerned with securing the best results from paving materials more readily available, under the direction of H. S. Mattimore, Engineer of Tests, and S. A. Bloom, Advanced Research Engineer. The work consists of the preparation of various paving mixtures for study, and exhaustive tests on the state's circular test roadway.

To prepare these mixtures in accordance with accepted and standard plant practices, they have installed in the state laboratory a 2-cubic foot Iroquois twin-shaft pugmill mixer made by the Iroquois Division, Lancaster Iron Works, Inc., Lancaster, Penna. One of the features of this mixer is the unique design of the twin shafts to facilitate quick removal for rapid cleaning and to permit readily changing the blade arrangement. Stub shafts, mounted in Link-Belt flanged bearings, extend through the mixer shell and are equipped with Neoprene seals to prevent leakage of material at this point. The stub shafts are equipped with flanges, to which flanges on the mixer shafts are fastened by two machine screws. By removing these screws, the shafts can be lifted out of the mixer. This construction obviates slotting the mixer shell and the necessity of installing gap plates which is standard practice in the larger conventional plant mixers of this type. Each shaft is equipped with welded reinforced steel blades furnished in three shapes, square ends for fine or topping mixes, pointed ends for coarse or binder mixes, and rounded ends for either fine or coarse mixes. Each shaft is extended at one end on which are mounted cut-tooth twin gears. Mixed material is discharged through an opening in the bottom of the mixer which is closed by means of a welded steel slide operating on slide rails.

As both hot and cold mixes are prepared, the mixer is also equipped with electric strip heaters, bolted to the out-

side of the mixer shell within an insulated jacket. The temperature is controlled by means of a manually operated three-heat switch and thermostat.

Twin cut-tooth spur gears on the outer ends of the mixer stub shafts are driven by a spur pinion on the variable-speed output shaft of a Link-Belt P.I.V. gear which in turn is direct-connected by an encased roller-chain flexible coupling to a 3-hp 1,750-rpm electric motor. Both mixer and drive are neatly and compactly mounted on a self-contained structural steel frame.

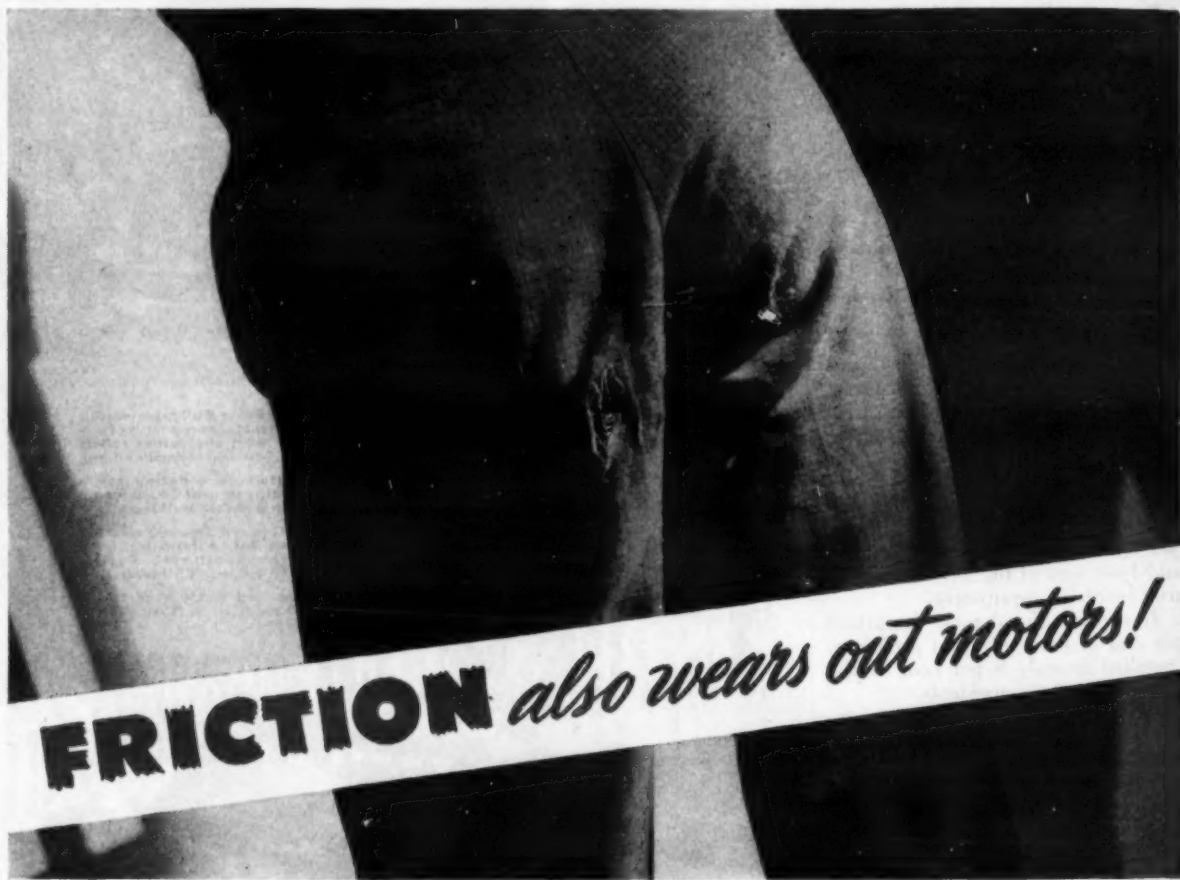
According to a recent issue of the *Link-Belt News*, the use of the P.I.V. gear permits positive and very accurate speed variation between 30 rpm minimum and 120 maximum rpm of the mixer shafts, by the simple turning of a hand wheel. Thus it is possible to study the effects of changing the mixing speed.

### Effective Water Stoppage

This is the title of a 12-page well-illustrated booklet on the characteristics and uses of Volclay to reduce seepage of water through soil and sand, to stop leaks in concrete structures such as dams and reservoirs, and as a crack

and joint filler in concrete, tile, or wood. Volclay is a natural hydrous silicate of alumina, with practically the same chemical constituents as other clay substances, but has a unique molecular structure which accounts for its ability to absorb many times its own weight of water and to swell enormously in the process, the increase at full saturation ranging up to fifteen times its dry bulk. Inert except for a slight alkalinity and containing only occasional traces of organic matter, Volclay is harmless to the human system and can safely be used in drinking-water reservoirs and in swimming pools. It imparts no taste or odor to water and exerts no harmful effect on plant or animal life.

In addition to a description of the properties and source of Volclay, this booklet explains how it works, what it has done and where it has been used, and how to use it. Copies of this booklet may be secured by interested contractors and engineers direct from the American Colloid Co., 363 W. Superior St., Chicago, Ill.



**FRICTION** *also wears out motors!*

A pair of pants is not as hard to replace as vital motor parts—but in either case, you're more interested in protection than in replacement. Macmillan RING-FREE Motor Oil protects pistons...rings...valves...bearings because it reduces friction faster!

### Reduced fuel consumption is proof of friction Reduction!

If friction is reduced, more horsepower is released to the drive-shaft—and this extra horsepower should be measureable in reduced fuel consumption. Compare RING-FREE with any other motor oil on that basis under similar conditions!

### RING-FREE removes carbon

Carbon removal is a natural RING-FREE function, inherent in the crude oil and retained by the exclusive Macmillan patented process. RING-FREE removes carbon while the motor runs!

In 1094 certified road tests, with various makes of owner-driven cars, the average immediate saving of gasoline was 1.3 miles per gallon after crankcases were drained and refilled with RING-FREE. In many types of Diesel operations, as much as 25% reduction in operating costs (including maintenance and fuel) are reported. At the same time, oil consumption is reported decreased!

Macmillan RING-FREE Motor Oil combines all these qualities:

- 1—Removes Carbon,
- 2—Reduces Friction Fast,
- 3—Saves Fuel,
- 4—Has Great Film Strength,
- 5—Has High Heat Resistance,
- 6—Long Cling to Metal,
- 7—Fast Penetration,
- 8—Is Non-Corrosive,
- 9—Is Less Affected by Dilution.

### Macmillan Petroleum Corp.

50 W. 50th, New York • 624 S. Michigan Ave., Chicago • 530 W. 6th, Los Angeles

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**MACMILLAN  
RING-FREE  
MOTOR OIL**

REDUCES WEAR BY REDUCING FRICTION



**Front End Shovels**  
For Industrial Tractors  
Write for Descriptive Circular  
**White Mfg. Co.**

ELKHART

INDIANA

# The District 5 Shop Of Kansas Division 1

## Subdivisions of Highway Maintenance Organization Are Well-Housed and Are Prepared for Emergencies

THE State Highway Commission of Kansas is thoroughly organized for its maintenance operations, both every-day and emergency, with six divisions having headquarters at Topeka, Salina, Norton, Chanute, Hutchinson, and Garden City. Each of these divisions contains from four to five districts, covering usually about three counties, with a headquarters office, repair garage and office at some central location in one building. The districts are further subdivided into sections with each Section Foreman supplied with a small storage garage. In another article (C. & E. M., February, 1943, page 13) we have described in detail the Division 1 offices, shops and garage, and in this article we carry the description through a District Shop to a Patrolman's Garage.

### The Wamego Shop

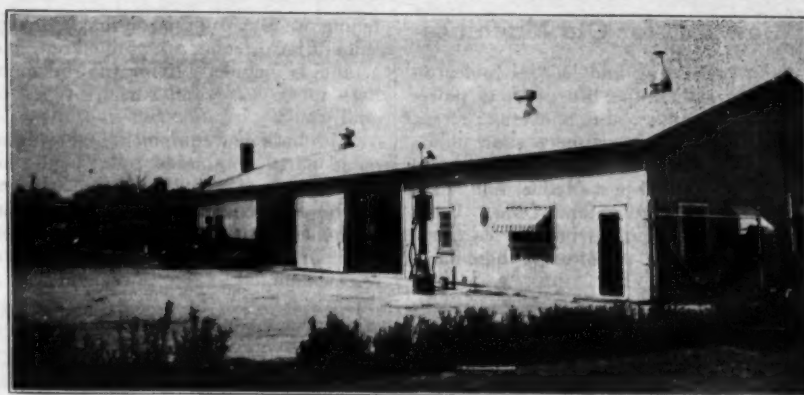
The Wamego Shop, the headquarters of District 5 of Division 1, is typical of the facilities provided at the district shops throughout the state. The building, a 30 x 90-foot galvanized-iron structure, is on the edge of town where a yard 100 x 600 feet is fenced off to protect the larger pieces of equipment stored there, including snow, fence and other materials. The shop and office building is located within the fenced area. Two wide doors on the front and one at the end permit the entry of all pieces of equipment used by the District for repairs and storage.

At the end of the building nearest the entrance to the yard are the offices of the District Supervisor and three store-rooms, one for lubricants and for dispensing them, one for hand tools like shovels, scoops, etc., and the third for tires and parts, the latter being stored in wood bins each numbered with the same identifying number shown on the perpetual inventory card of the shop for that part. The same inventory system is used throughout the state for convenience in putting through repeat orders for the various parts.

At the back of the shop, starting from the office end, one finds a set of racks high off the floor for the storage of steel and wood signs for the highways in the District, as well as warning signs for use when there are emergency operations

underway, such as detour signs for use when floods have cut across the highways and the emergency crews are back-filling the approaches to bridges. Next to the signs is the Curtis garage compressor providing air under pressure for all uses in the garage and shop. On the same bench with the compressor is a General Electric Tungar battery charger. On the concrete floor, for service all over the garage and shop, is a double A-frame crane with an I-beam cross beam for a Yale 1/2-ton chain hoist used to lift heavy parts, engines and materials from trucks.

Alongside the charger is a machinist's bench and at the end a set of 8-foot cabinets containing the tools for the mechanics. These are kept locked except when the men are working with the



C. & E. M. Photo  
The District 5 Garage in Division 1 of the State Highway Commission of Kansas—a typical unit.

tools, to protect the valuable tools from possible theft.

At the front of the garage in the far corner from the offices is the blacksmith shop with a Black & Decker bench grinder and buffer, a forge and anvil, and another machinist's bench. A bending

block rests on the floor ready for the use of the blacksmith or a welder in shaping hot metal. On the bench again is a Black & Decker 1/2-inch electric drill rigged as a light drill press. A complete Airco acetylene welding outfit completes

(Concluded on page 54)



## HE KNOWS HIS BUSINESS

He operates a power shovel and delivers top performance because he knows how.

We manufacture industrial friction materials that are correct and dependable because we know how.

When you specify Raybestos you get brake linings and frictions of 38 years proven quality and performance, specially engineered to meet the exact requirements of every machine that you operate.

Raybestos can supply all your friction material needs. And fastest deliveries are assured through your local Raybestos distributor. See him or wire us.

THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc., BRIDGEPORT, CONN.

RAYBESTOS IS AMERICA'S BIGGEST SELLING BRAKE LINING

**Raybestos**  
INDUSTRIAL  
FRICTION MATERIALS

FOR SHOVELS • CRANES • HOISTS • TRACTORS & EARTH MOVERS

**ASPHALT  
★ MIXING  
PLANTS**

PORTABLE  
and  
STATIONARY



★ Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, incorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. Write for Bulletin CE-260.

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### New Life for Old Machines

An interesting and helpful folder on how to extend the life of your power shovels, tractors, dirt movers, rooters, rippers, scarifiers, crushers, snow plows, gears, and other units and parts has just been issued by Coast Metals, Inc., 1232 Camden Ave., Canton, Ohio. Coast Metals hard facing is briefly described, the simple technique of using these hard-

facing welding rods is outlined, the results of hard facing are pointed out, and a table is included, giving the rod numbers to be used for various types of equipment.

With both new equipment and replacement parts obtainable today only on high priorities, the importance of conserving and extending the life of present equipment grows greater with each passing month. Contractors and state and

county highway engineers who are interested in securing further details on the Coast Metals rods available for this purpose may secure copies of this and other folders direct from the company. Just mention this item.

### Gar Wood Staff Changes

A number of changes in the engineering staff of Gar Wood Industries, Inc.,

Detroit, Mich., has been announced. George D. Shaeffer, formerly Chief Engineer of the Road Machinery Division, has been made Chief Engineer of all the Gar Wood engineering departments. A. C. Evans has been promoted to Chief Engineer of the Road Machinery Division. I. C. Moreau has become Chief Engineer of the Hoist & Body Division, and J. E. Monahan has been placed in charge of all hydraulic engineering.



35" Clearance  
with Doors  
Wide Open

## High Dumping Clearance Speeds Operation to New Records—with the HEIL Bottom-Dump Trailer Wagon

By employing a construction principle long accepted in other construction equipment but never before used in a dump wagon, Heil engineers have made possible a totally new standard of performance for this type of equipment. The high clearance doors are POWER-OPENED in 2 seconds. The Heil cable power control unit is direct-connected to the tractor engine, and operates independently of the tractor transmission at any time when the engine is running. The dumping operation is under fingertip control. The load lets go all at once or spreads as with a cable scraper, at the will of the operator. This new Heil unit dumps and gets away in a flash. You need it to compete successfully in post-war earthmoving operations. Get the complete story now and be prepared. Post-war orders now being accepted. Write for bulletin.

R-12

Left: Heil Cable Scraper Interchangeable on Same Power Unit  
Right: Heil Hydraulic Bulldozers



26" Clearance  
with Doors  
Closed

### Clamshell Principle

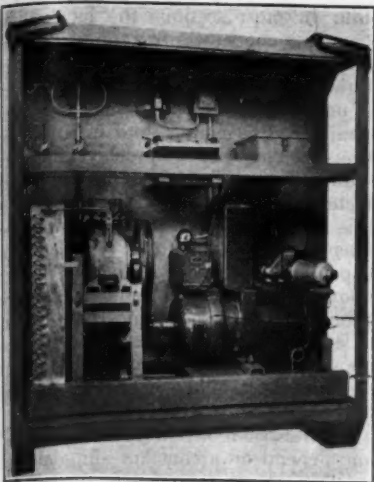
The familiar clamshell is opened by power, swings closed by gravity. That is exactly how this new Heil unit operates. When the dumping doors are pulled open by CABLE POWER, the doors swing up alongside the hopper — out of the way. The high clearance doors are interlocked, completely synchronized, fast and positive in operation. Patented construction.



# THE HEIL CO.

GENERAL OFFICES

MILWAUKEE 7, WISCONSIN



A Type B Weber gasoline-engine-operated refrigerator unit, designed especially for use in distant construction camps where electric power is not available.

### Refrigerator Units For Remote Workers

Waging war, whether by soldiers on the fighting fronts or by construction battalions laboring far from sources of fresh supplies, requires good food and plenty of it. One of the many problems to be solved in the construction of the Alaska Highway, and on the Canol Highway Project, in the rugged Canadian Northwest, was that of furnishing the men with full quotas of fresh food. Both deliveries and permanent storage are made possible by portable refrigerated carriers of 150-cubic foot capacity, developed to meet U. S. Army and Navy specifications by the Weber Showcase & Fixture Co., 5700 Avalon Blvd., Los Angeles, Calif. Not only do these containers make it possible for fresh food to reach distant jobs, but the carriers are easily moved from place to place, their refrigeration mechanism continuing to function without let-up.

They may be towed on skids behind a truck or tractor, or lifted by a crane and carried in a truck. Two flanged I-beam skids, providing 6 square feet of bearing surface, serve as sled runners for towing. These skids, turned up on each end, are permanently welded as part of the box frame, and are provided with 2-inch holes at both ends by means of which a chain may be attached for dragging. Lifting rings and slings are also provided in the box frame, so that the carrier may readily be handled by a crane.

These units, one of three types developed by Weber, are designed to operate on gasoline-engine power, for use in regions where outside power is not available. A Kohler power plant, functioning by direct drive, not only provides the power for refrigeration but also creates enough current to run a small additional amount of electrical equipment in the camp. Perishables may be kept in a frozen state at 8 degrees F or preserved in a non-frozen state at 35 degrees F. Only a simple change in switch settings is necessary.

The extreme overall size of these carriers, equipped with skids and sling, is 9 feet in length, 6 feet wide, and 7 feet 6 inches high. The box is basically constructed of a welded steel frame over which heavy-gage steel sheets are continuously welded to make a completely sealed box. Fiberglass insulation enables the box to operate under all conditions. Normally the refrigerating mechanism operates during 16 of each 24 hours, the generator stopping and starting automatically within prescribed temperature ranges. Cooks and others using the box walk in through a double-sealed door which is provided with heavy-duty hinges and two wedge-type locking handles. The inside is illuminated by a light operating from a battery.

To insure continued operation in the field, there are packed within the compact machine enclosure a complete set

of tools for normal maintenance; spare parts for engine, generator and compressor; an extra set of belts; and a drum of Freon.

### Worthington Acquires Ransome Machinery Co.

Worthington Pump & Machinery Corp., Harrison, N. J., has announced the acquisition of the Ransome Machinery Co., Dunellen, N. J., manufacturer of concrete mixers and road paving equipment, as a wholly-owned subsidiary.

### New Buda Appointment

Announcement has been made by the Buda Co., Harvey, Ill., of the appointment of C. N. Guerasimoff as Chief Engineer of Buda's Engine Division. Mr. Guerasimoff, who has been with Buda since 1934, has been in charge of the development and testing of diesel engines, and in August, 1941, was made Assistant Chief Engineer in charge of the Radial Diesel Engine Division.

### Electric Hand Saws For Many Services

Properly used, an electric hand saw can save time and money, enabling one man easily to do the work of five men with hand saws, and faster. In the Porter-Cable Speedmatic saw a definite endeavor has been made to improve on the one-to-five ratio.

The helical gear drive delivers 98 per cent of the motor power for actual cutting, driving the saw at 7,000 rpm. The Speedmatic is well-balanced with the handle above the center of gravity. Because of its adjustments, it can be used for rip sawing, notch work, mitre cuts, dado cutting, and, equipped with an abrasive wheel instead of a saw, it is used to cut brick or remove mortar between bricks and to cut slate.

The utility of the saw is further extended by the Speedmatic radial arm. The base of the radial arm is bolted to a rigid metal frame 35 inches square with detachable legs. On this supporting frame is also mounted an oak cutting

table 17 x 40 inches with a removable backstop. The vertical column is cast iron with a large bearing, which swings on the base 60 degrees right or left. A ring clamps around the entire base, thus holding it firmly and evenly when clamped at any angle. The slide head is cast integral, with a long shank providing travel 7 inches up and down by means of the top wheel, which operates a totally enclosed screw protected from moisture and dirt.

The hollow steel slide bar on the radial arm is 2 1/4 inches in diameter, traveling 27 inches on eight sealed bearings in the head. The saw mounting bracket, securely fastened to the slide arm, quickly changes from cross cutting to ripping position with a half-turn of the handle above. This head is provided with an adjustable hold-down arm for ripping.

Complete information regarding the Speedmatic electric hand saw and the Speedmatic radial arm may be secured direct from The Porter-Cable Machine Co., 100 Wolf Street, Syracuse, N. Y., by mentioning this item.

## MAKE YOUR LAST Shovel, Crane or Dragline LONGER!

**TIMELY TIPS**  
for the  
Shovel, Dragline & Crane  
Operator

★ You who have LIMA shovels, draglines and cranes are fortunate in having machines that are built to serve their owners throughout a long, profitable life, but regardless of how good a machine is, it requires normal servicing. Today when it is difficult to get new equipment because of war work, it becomes definitely important that you give your present equipment proper care. To assist you in this respect we have prepared a 32 page booklet, titled, "Timely Tips for the Shovel, Dragline and Crane Operator." The booklet is full of information to help the operator get better and longer service from his machine. *Your copy is ready, write for it today.*

LIMA LOCOMOTIVE WORKS, Incorporated  
Shovel and Crane Division LIMA, OHIO

# FREE!

TO OWNERS AND USERS OF  
SHOVELS, DRAGLINES AND CRANES

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LIMA LOCOMOTIVE WORKS, INCORPORATED  
LIMA, OHIO

Gentlemen:

Please send me a copy of your "Timely Tips" booklet.

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Firm \_\_\_\_\_

*Buy War Bonds  
and Stamps!*

SHOVELS, 1/4 YD. TO 3 1/2 YD.

DRAGLINES, VARIABLE

CRANES, 13 TONS TO 65 TONS

# Electric Hand Tools Must Outlast the War

**Your Job Is to Guard and Care for Them to Lengthen Their Life by Proper Use; Do's, Don'ts, Safe Practices**

† MOST of the repairs to portable electric tools are made necessary by the failure of operators to follow a few simple maintenance rules. Often, according to one service man, this is due to the fact that no one person is responsible for the maintenance of a group of such tools and, therefore, such elementary points as lubrication, motor brush replacement, etc., are neglected. This article is prepared specially for readers of CONTRACTORS AND ENGINEERS MONTHLY to bring together the best thought on the operation, care, and maintenance of electric hand saws, drills, and hammers.

Each manufacturer of high-grade portable electric tools tries to make his tools as nearly "fool-proof" as is possible. To that end he designs them for easy use and safety to the operator. He installs motors with reserve power. He uses bearings that will stand up. He makes the castings of metal that is both strong and light. To use a popular phrase, he builds his tools so that they "can take it", which applies to abuse as well as their use.

No two tool users will treat their electric tools exactly the same way. The treatment they are given ranges from overcarefulness to real abuse. The sensible owner will use his tools for the purpose for which they were designed, and not push them beyond their rated capacity. He will watch for wear on working and electric parts, will keep his tools properly lubricated, and be careful not to drop them on hard surfaces.

It is to be expected that electric tools will require some maintenance, but by giving tools the proper care, the repairs and replacements will be limited to worn and burned-out parts. The best advice to

users is to buy good tools, insist on their being used carefully, and do not attempt to make major repairs. Instead, take your tools to the nearest manufacturer's branch or authorized service station where special equipment and factory-trained mechanics are available. This is not "advertising talk" on the part of a manufacturer, but manufacturers report so many cases where repairs made by mechanics not familiar with this type of equipment have resulted in serious damage to tools that we believe this point cannot be overstressed.

Study this text carefully, follow the directions and cautions; do it right, don't overdo, and don't slacken your watchfulness over any of your electric hand tools. They must be made to outlast the war.

## General Precautions

Most electric hand tools are equipped with universal-type motors that will operate on either direct current (dc) or on alternating current (ac) of varying cycles, usually 25, 40, 50, or 60, but these motors will operate only on the voltage that is designated on the name plate of the motor. Serious damage to the motor will result if the designated voltage is varied more than 10 per cent.

Those motors which are not universal must be used on the type of current for which they are wired, and the same precautions regarding voltage variations must be taken—use only the voltage specified on the name plate.

Not all jobs are located conveniently near to electric power. On isolated construction jobs, the saw or drill owner will usually have at least one of three sources of power open to him. When a power outlet in a residence or other building is reasonably near the job, it is frequently possible to use this power for some suitable consideration in connection with the owner's light and power

bill. In most sections the local power company cooperates by tapping convenient overhead lines and installing a temporary meter on the job. However, there is no national policy among power companies in this matter, and in a few sections the expense and delay connected with the installation of a temporary meter will partly offset the economy of this service. When isolated jobs are frequent, it is possible to be completely independent of the two sources mentioned above by investing in a portable electric generator. These machines are dependable, light in weight, and cheap to operate. The model to select depends upon the size and number of portable electric tools you operate.

All electric-tool motors are air-cooled and depend on a constant abundant circulation of air for efficient cool operation. The ventilating fans draw an ample supply of air through the motor and housing. The ventilating holes or slots in the housing are usually of non-clog design to prevent stoppage of air flow.

(Continued on page 29)



C7 in action

## Just What You Need for PAVING BREAKING

WHATEVER your requirements, there is a Cleveland Paving Breaker exactly suited to the job. The 80 lb. C7 is the right tool for average work—two C7's run from a No. 85 compressor. For heavier work, use the C9; it is 2 lbs. heavier, but uses no more air. C9 is a slugger that licks the toughest, reinforced concrete. For light work, trimming, etc., try the C10, the little fellow with the big wallop. Three C10's run from a No. 85 compressor. Model C11 is the 58-pound machine with the long stroke and the heavy "slugging" blow—a favorite wherever used. Extremely economical as to air consumption.

Among accessories you can't beat "Cleveland" chisels, moils and miscellaneous paving breaker tools. Try the 14" narrow chisels, they cost no more than moils, but cut faster. Then specify tough, durable Cleveland "Veribest" air hose. Finally, connect it with Cleveland quick-acting Type "A" hose couplings, and you are all set for the toughest paving breaker job.

Ask for Bulletin 128 on Cleveland Paving Breakers

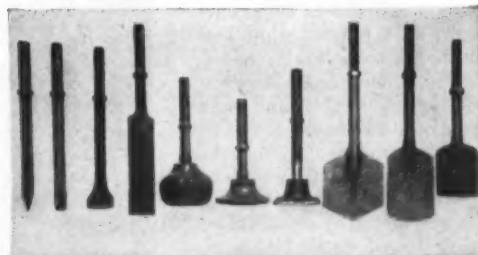
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Division of The Cleveland Pneumatic Tool Company

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*Electricity for any Job  
Anywhere*

★ ONAN GASOLINE DRIVEN ELECTRIC PLANTS provide electricity for engineering and construction projects remote from commercial power sources, and for emergency and standby service.

Thousands of these sturdy, reliable units are doing a winning job with our Fighting Forces everywhere, providing electricity for many vital war tasks.

### 350 TO 35,000 WATTS

A.C. 50 to 800 cycles, 110 to 660 volts. D.C. 6 to 4000 volts. Also dual A.C. and D.C. models. Air or water cooled.

We'll be glad to furnish details on your present or post-war need for Electric Plants.

Model shown is W.C. 3000 or 3000 Watt, Water Cooled.



**D. W. ONAN & SONS**

1233 Royalston Ave., Minneapolis, Minn.



The new Firestone head-loosening outfit to facilitate the removal of tires from rims.

### Removing Truck Tires From Rims Simplified

The tough service problem of loosening truck-tire beads from the rims has been simplified and made easy by a new Firestone tool that can handle tires of virtually any size, including huge earth-mover types. Compact and light, the new tool was originally designed for airplane tires which become vulcanized to the rims by the heat generated in landing. The tool has now been tested for truck-tire usage, and a new technique of demounting has been developed which is much simpler than that necessary with airplane tires.

The head-loosener is provided in a kit 38 x 6 x 6 1/2 inches in size and weighing only 48 pounds, and the kit completely eliminates the need for bulky hydraulic equipment or for such destructive methods of head loosening as pounding on the tires with sledge hammers. In addition to the new tool, the kit contains enough equipment to carry through all the work of demounting a tire and mounting it again.

Used properly, the tool cannot injure the tire or the rim, and it is reported that an inexperienced worker can be quickly taught to use it without damaging the equipment. The tool includes a metal bar, hooked at one end, with an adjustable lever attached near the straight end of the bar, and two adjustable hooks. With the tire laid flat and deflated, the tool utilizes a system of hooks and leverage to force any bead loose from its rim in a few minutes, no matter how firmly the rubber and metal are joined.

To simplify the mounting of tires, the Firestone kit contains, in addition to the new tool, a valve holder, valve repair tool, valve extension, tire irons, a hammer made of rubber and metal, and a strap. The kit permits easy mounting of a tire by one man, without other equipment, and a hook on the versatile head-loosener allows use of the tool in pulling the rim out of the tire after the bead has been loosened.

Further information on this new tool and tire kit may be secured by those interested direct from the Firestone Tire & Rubber Co., Akron, Ohio, by mentioning this item.

Do you know that every minute of the day and night somebody's home or place of business is being burned? Don't let preventable fires work for the enemy.

### SAND'S-STEVEN'S Line & Surface LEVEL



Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.  
8311 Gratiot Ave. Detroit, Mich.

### Post-War Tracings Now Printed Faster

A new mercury-vapor quartz lamp is used in a recently developed high-speed printer which produces black and white prints of engineering plans one hundred times faster than the original use of natural light. These black and white prints are direct positive black-line copies which are taking the place of blue prints in many quarters. The printer, produced by Charles Bruning Co., 4700 W. Montrose Ave., Chicago, Ill., is known as Model 157 and was developed as an aid to speeding up the reproduction of ship-building designs and engineering drawings in war work in general.

The new light tube, developed by Hanovia Chemical & Mfg. Co., Newark, N. J., is equivalent to six to eight powerful carbon arc lamps. It is a high-pressure mercury arc in an enclosure of fused quartz. In addition to the increased speed in exposing prints, the lamp requires less power consumption than previous models and is therefore less ex-

pensive to operate. The combination of light and machine develops black and white prints at a top speed of 25 feet a minute.

Complete information may be secured direct from Bruning by mentioning this item.

### New Type of Clutch For Your Equipment

A new clutch, which operates on the principle of a tire-like rubber gland and is expanded by air pressure to effect a union between the driving and driven members of any machine, has been developed by Fawick Airflex Co., 9919 Clinton Road, Cleveland, Ohio. There are no toggles, arms, springs, or levers required, and the control is entirely through regulated air pressure, making possible remote control from practically any distance. The manufacturer calls attention to the fact that there are no adjustments required and no oiling. The Airflex clutch is smooth-starting, runs

cool, and may be used as a clutch, slip clutch, coupling, or brake, as desired.

A complete description, including many illustrations showing the use of Airflex clutches on diesel drives and on heavy machinery, as well as on construction equipment, will be found in Bulletin 200, which may be secured direct from the manufacturer by mentioning this short review.

## STERLING PUMPS

**BUILD FOR DEFENSE**  
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Simple, Dependable, Rugged... the choice of leading contractors everywhere. Write for literature and prices.

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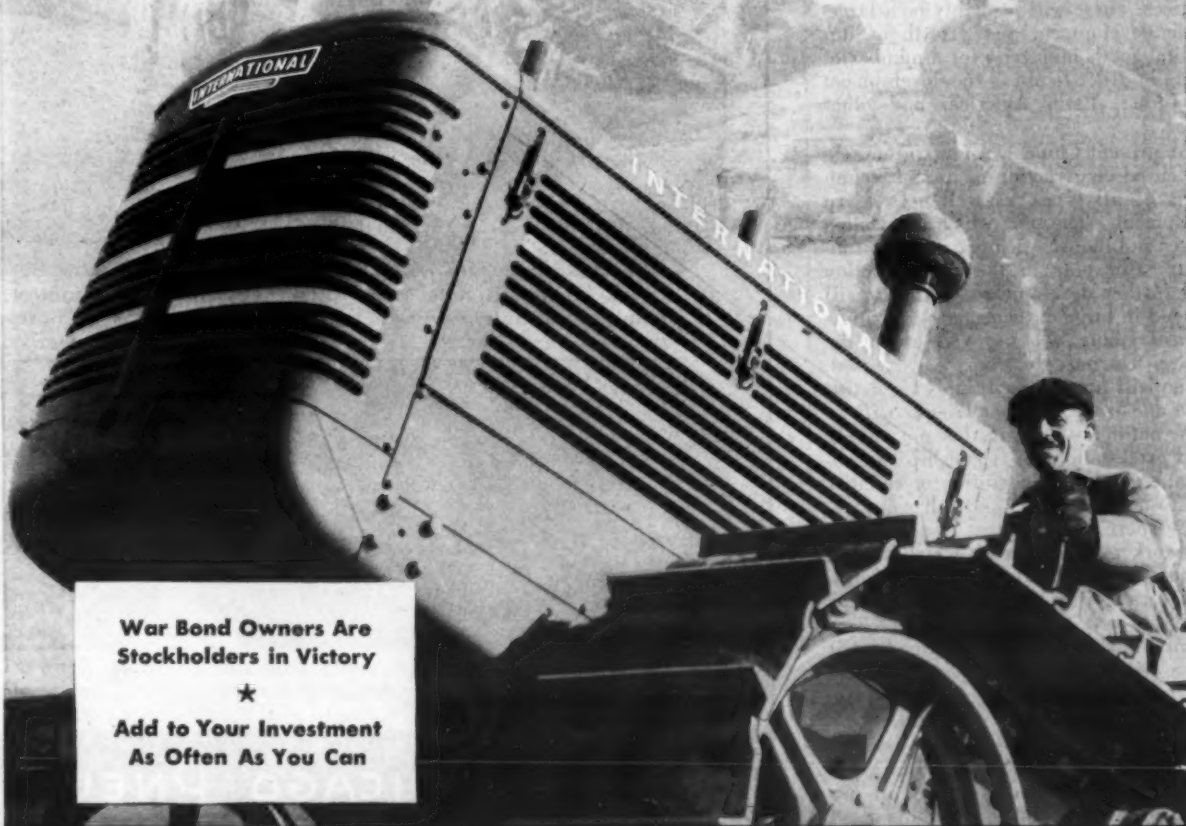
## International Industrial Power Is Fighting Power

The faithful International Industrial Equipment that is working such long hours on the home front is not under enemy fire, but it is putting up a whale of a good fight just the same.

International TracTracTors, Wheel Tractors and Power Units make up as scrappin' a combination of heavy-duty construction equipment as you'd ever want to see. Count on the performance of these tractors and engines wherever there is hard work to do.

Fighting power and INTERNATIONAL POWER go hand in hand. Guard that power well because replacement equipment is not plentiful. If you must have new equipment, see the International Industrial Power dealer about your eligibility. If a reconditioned tractor or engine will do, he may have just what you are looking for. Keep in touch with him on service. His shop is well equipped and his experienced servicemen know service from A to Z.

**INTERNATIONAL HARVESTER COMPANY**  
180 North Michigan Avenue Chicago, Illinois



War Bond Owners Are Stockholders in Victory

Add to Your Investment As Often As You Can

**INTERNATIONAL POWER**

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## Future Construction Is Stimulated by War

(Continued from page 2)

ple have been killed off en masse or have been broken in physical and mental health, it may take years before a sufficient number of energetic educated trained men and women are available for the gigantic task of reconstruction.

Russia also faces a tremendous task of rebuilding the areas devastated by the ravages of war, but Russia has enormous resources of man-power, materials, and determination (as we have learned from her share in the war) and, unless there is a drastic change in her policy, will continue to solve her problems in her own way. Russia has a great enthusiasm and admiration for American industrial genius, but generally prefers to adapt such technical knowledge to the Russian way.

### Other United Nations

Among the first of the other United Nations to develop a post-war program is China. In the book "China's Destiny", Generalissimo Chiang Kai-shek proposes a 10-year plan that includes the construction of 12,500 units of railways, 137,000 miles of highways, 220,000 automobiles, 12,000 transport planes, airfields, and the facilities to train 2,000,000 technicians. Under the terrible necessity of war, China has become a nation unified in purpose, and sharply and suddenly aware of her great potential resources. Under her present brilliant and foresighted leaders, China, unlike Japan, is capable of taking the best of Western industrial progress and adapting it to her own peaceful culture, to emerge one of the world's great nations, progressive, civilized, and a force for peace in the world.

According to the National Resources Planning Board, the economic development of China is one of the essential factors in our post-war policy in the Far East. But the economic development of China will depend largely upon the amount of foreign capital and service which she can obtain for the building of roads and railways, the erection of power plants, the construction of new industries, and the development of resources. There will probably be a large-scale development and growth of our capital-goods industries for a number of years in order to aid in the development in China, Latin America, and other areas.

At present China lacks engineers, experienced construction men, and technicians of all types, as well as modern equipment. The part which the United States and the American construction industry can play in the reconstruction and further development of China will depend in large measure on our attitude toward China now as well as in the future. During the post-war period, China will turn to her friends for assistance and trade, and her friends will be those nations which give her not merely loud protestations of friendship and admiration but the recognition of equality due to a great nation and a heroic people. There will be great opportunities for work in China, work which can be stimulating and challenging to American engineers and contractors, but it will be available only to those who accept it in a spirit of cooperation and friendliness. There will be no more foreign exploitation of China.

Australia, that island continent "down under" which once seemed so remote and now has moved so much nearer, is already thinking and planning in her usual progressive fashion for the post-war period. David W. Bailey, Director, Australian News & Information Bureau, reports that a very large public works program will be undertaken in the im-

mediate post-war period as part of the reconstruction program now being blue-printed.

The *Melbourne Age*, reporting on the plans of industry for post-war reconstruction, points out that when the war is over, Australia will be confronted with the greatest task of economic recon-

struction and development in her history. Plans to meet this unprecedented situation are now being laid down, not only by Governmental authorities but also by private industry. Of Australia's 5,000,000 men and women between the ages of 14 and 65, 68 per cent are now in war occupations. The report goes on

to say:

"How will these people be employed when the war ends? There is an accumulated housing shortage to be met. This will require the building of at least 250,000 new houses. The construction of roads and public buildings, the ex-

(Continued on next page)

## INCOMPARABLE



Ability to stand up under the toughest service ever encountered is characteristic of Owen Buckets.

Exclusive features—scientific designing—protected working parts—efficient lubrication—combine to assure the exceptionally long life for which these buckets are noted

**The OWEN BUCKET Co.**

6030 Breakwater Avenue, Cleveland, Ohio

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# Owen Buckets

A MOUTHFUL AT EVERY BITE



## Four Helpful Hints



### FOR OPERATORS OF DEMOLITION TOOLS

CP Demolition Tools, like CP Sinker Drills, are built to take it — hour after hour, day after day. With regular lubrication and a few simple check-ups, they give top performance in the toughest kind of demolition work. Illustrated are four easy-to-follow suggestions that will help you get maximum performance, longer spring life and minimum maintenance costs with CP Demolition Tools. Other helpful hints will appear in future advertisements.

### HOW TO GET MAXIMUM SERVICE FROM YOUR CP DEMOLITION TOOLS



**1** Check backhead nuts every day. Keep them tight. If nuts are loose, tool will lose air.



**2** Tighten fronthead bolt nuts evenly. Do not compress springs. Leave  $\frac{1}{4}$ " space between coils.



**3** Before putting tool away, clean with air hose. Plug air inlet and exhaust with rags or waste.



**4** Even a CP Demolition Tool needs a sharp peg point. Check points daily — keep them sharp.

\*\*\*\*\*  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
(Nicycle...Universal)  
ROCK DRILLS

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AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES

## Other Nations' Plans For Work After War

(Continued from preceding page)

tension of irrigation, afforestation, soil conservation, development of power and lighting services, building of railways, development of air transport, building up of industrial enterprises in areas where they can obtain their raw materials close at hand, improvement of child welfare, of health and fitness services, and the provision of normal peacetime requirements and conveniences—all these will be the avenues which can provide useful employment, develop the country, and at the same time raise the standards of living and the demand for goods." The report indicates that in the future Australia will make many articles that previously she imported.

The Union of South Africa, the largest overseas buyer of American automobiles, is also looking forward to the post-war period. This member of the British Commonwealth of Nations is in many ways very similar to the United States. It's a large young rich country, modern and progressive, with the benefit of a similarly temperate climate. South Africa has already done some solid planning for the years to follow the war. In May, 1940, an Industrial Development Corp. was established by Act of Parliament to provide guidance in the promotion of new industries and to give certain financial assistance, the main objective being that industrial development within the Union should be planned, expedited, and conducted on sound business principles. A Civil Reemployment Board has been established to frame principles for the reabsorption of men and women returning from active service to civil life, and a Social and Economic Planning Council has been called into being.

As part of its war program, but which has a definite bearing on the post-war period, a Central Organization for Technical Training was established. This means that in providing technicians of all types for war service, the Union will have available a greater number of trained people after the war, to take their place in industry and contribute their share to the further development of South African industries.

South Africa has been a large purchaser of goods made in the United States. Like Australia and other countries, however, it is entirely probable that she will produce more of her own manufactured goods and machines after the war, to utilize her greatly expanded industrial facilities.

Plans are already being made by many large industries for the restoration and reconstruction of foreign facilities which have been destroyed during the conflict. As an example, the Royal Dutch Co. has announced the formulation of plans for the reconstruction of

its oil wells and refineries in that area, most of which were deliberately destroyed by the Dutch to prevent their benefiting the Japanese.

In many other areas of the world, in North and East Africa, in the South Pacific, there will be new opportunities for development and the attendant construction when the war is over. Many of these peoples have seen for the first time the results of American industrial ingenuity, have seen tractors and bulldozers, dirt-moving scrapers and power shovels, in the hands of American Engineers, work miracles of road-building, airport construction, and so on, in record time. It seems likely that some of those people will desire for themselves the kind of implements which can improve their transportation and communications, and raise their standard of living. On the other hand, it is also conceivable that, having seen the destructive use to which the so-called civilized nations have put their inventive genius, they may prefer to revert to their primitive isolation and stay there.

### Latin America

Long-range plans for the development of Latin America are being aided by the recent appointment of an Inter-American Development Commission in the United States, which will work with similar commissions already formed in the twenty other American republics in post-war economic planning. The United States Commission, headed by Eric A. Johnston, President of the U. S. Chamber of Commerce, will also work closely with the Committee for Economic Development, of which Paul G. Hoffman is Chairman, and which is now stimulating post-war planning by private businesses in this country.

As a result of our "Good Neighbor" policy, of the united efforts of all but one of the republics below the Rio Grande in defeating the Axis, and of their enforced isolation from European markets, the post-war period presents to this country an excellent opportunity for continued economic cooperation and trade in this hemisphere which will rebound to the benefit of all concerned.

The Latin American countries have awakened to their own potentialities and possibilities of development as never before. But, like every other industry in Central and South America, construction has been greatly delayed or postponed, and there is a steadily accumulating backlog of requirements which they must have from other countries to begin appropriate construction which has been deferred by lack of necessary materials and equipment in their own countries, according to Major B. P. Root, of the Bureau of Foreign and Domestic Commerce.

The work of the Division of Health and Sanitation of the Office of Inter-American Affairs has shown the people as well as the governments of these countries what the expenditure of comparatively small sums can mean in improved sanitation, leading to better national health, which in turn results in a more ambitious population with a desire for higher standards of living, which creates more international trade. Ministers

(Continued on page 46)



### A Rooter Will Help You Move More Yardage Faster With Fewer Men and Machines and at Lower Costs

You can increase the efficiency of your Tournapull and tractor-operated Carryall Scrapers by breaking up all hard materials—shale, hardpan, sun-baked clay or frozen ground—with a LeTourneau Rooter. By using a Rooter you get bigger Scraper loads in less time, and cut down maintenance on your tractors and tractor tools.

On most earthmoving jobs in tough, rocky material, rooting also eliminates the need for shovels, compressors and drills and gives better fragmentation for Scraper loading than does blasting. It's safer . . . faster . . . far cheaper . . . and requires fewer men. Thus, you save on both manpower and tools.

#### Built to Work On Your Dozer Tractor

Both Le Tourneau Rooter and Dozer are single-cable operated . . . can be combined on standard rear-mounted 2-drum Power Control Unit . . . to root and doze over short hauls with one tractor, or for pusher loading rooted materials into Carryall Scrapers. Your tractor operator easily handles both tools . . . neither interferes with the operation of the other.

#### Quickly Interchangeable

Rooter is easily dropped to free tractor for LeTourneau Carryall Scraper, Crane and other drawbar work . . . thus, further increases the usefulness of your tractor.

#### 2,000 in Use

More than 2,000 rugged LeTourneau Rooters are now in use by successful contractors, miners, pit and quarry operators, and loggers all over the world . . . demonstrating by actual job proof that the Rooter method can lower your earthmoving costs . . . same time, help you lick the man and machine shortage problem. Put these profit-making, work-increasing Rooter methods into operation NOW.

And for parts and repair service . . . call your LeTourneau—"Caterpillar" dealer. He is equipped to keep your tractors and LeTourneau earthmoving equipment working at full efficiency for Victory.

Ground Frozen 16 to 20 inches deep

is here broken up for Scraper handling in midwinter by a LeTourneau Rooter pulled by two "Caterpillar" D8 tractors. LeTourneau Rooters are stoutly welded to stand up to tough going like this.



Manufacturers of DOZERS, CARRYALL SCRAPERS, POWER CONTROL UNITS, ROOTERS\*, SHEEP'S FOOT ROLLERS, TOURNAPULLS\*, TOURNAROPS\*, TOURNATRAILERS\*, TOWNAWELDS\*, TRACTOR CRANES.

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PEORIA, ILLINOIS STOCKTON, CALIFORNIA

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Simple in construction Economical in cost Dependable in operation Available in 1500, 8,000 and 16,000-candlepower units

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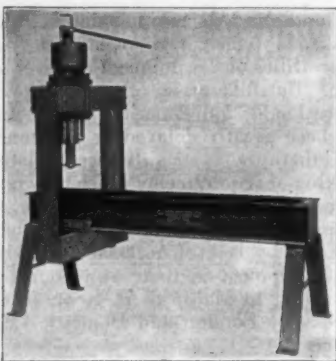
NATIONAL CARBIDE CORPORATION  
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The new Bee-Line hydraulic press.

### New 50-Ton Model Hydraulic Press

An improved model of a hydraulic press for use in contractors' and state and county highway department shops has recently been announced by the Bee Line Co., P. O. Box 569, Davenport, Iowa. Designed for speed and dependability, this unit is available with an 84-

inch or a 96-inch bed, and will handle all types of press work requiring pressure within the limits of 50-ton capacity.

The press itself is fitted to the bed with machine slides so that it may be moved to any point within the entire length of the bed. A great range of flexibility is also provided by the support construction which permits the head to be moved crosswise. The press has a 16-inch clearance between the end of the ram and the top of the bed. The ram travel is 7 inches, while a quick-acting screw in the ram travels 7 inches, making a total available stroke of 14 inches.

Further information on this Bee Line 50-ton hydraulic press may be secured direct from the manufacturer.

### Awards Made in Contest For Metal Conservation

C. S. Parks, Acting Works Manager of the Blaw-Knox Co., Martins Ferry, Ohio, was awarded a \$250 War Bond as first prize in the Metallizing Engineering Co.'s third Conservation Contest for the

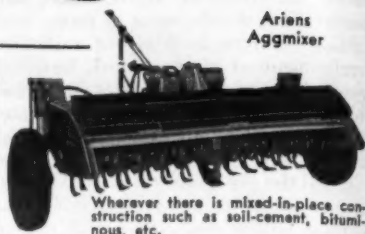
most outstanding examples of machinery maintenance or parts salvage by the metallizing process. Mr. Parks' prize was for a procedure which eliminates scrapping of mis-machined parts.

The second prize of a \$150 War Bond went to H. H. Pokorny, Machinery Service Ltd., Ville LaSalle, Quebec, for a description of machine-tool spindle maintenance, and third prize of a \$100 War Bond, plus a special \$50 Bond award, was given to W. J. Taylor, Sinclair Refining Co., Marcus Hook, Penna., for his method of reclaiming worn pump rods.

Other bond winners were H. N. Pendleton, Dravo Corp., Pittsburgh, Penna., for the repair of worn propeller shafts, and R. McClain, Freedom Oil Co., Freedom, Penna., for the maintenance of pressure-pump cylinder liners. A \$50 Bond went to S. C. Simmermacher, Division of Water and Heat, Cleveland, Ohio, for crankshaft maintenance.

Full information on these contests may be obtained from the sponsor, Metallizing Engineering Co., 38-14 30th St., Long Island City, N. Y.

### THE MOST IMPORTANT UNIT FOR AIRPORT RUNWAY CONSTRUCTION



Ariens Aggmixer

Wherever there is mixed-in-place construction such as soil-cement, bituminous, etc.



### IT DOES THE JOB THOROUGHLY, RAPIDLY, AND ECONOMICALLY

The AGGMIXER operates with other general purpose road equipment—from power take-off shaft of any suitable tractor—easy and safe to operate. The swirling chopping action of the AGGMIXER tines does a thorough job of mixing—wet or dry. Illustrations above show use on airport runway construction. Send for job facts now.

**ARIENS COMPANY,  
BRILLION, WISCONSIN**

### PILE HAMMERS and EXTRACTORS HOISTS-DERRICKS WHIRLERS

Special Equipment  
Movable Bridge Machinery

Write for descriptive catalogs.

**McKIERNAN-TERRY CORP.**  
19 Park Row, New York

Distributors in Principal Cities



**Be Prepared FOR POST-WAR RECONSTRUCTION**

**YOUR** share in the rebuilding of a war-worn world will, in a large measure, be determined by your operating costs . . . Today, on all fronts—at home and abroad—the dependability, operating speed and truck mobility of MICHIGAN Mobile CRANES and SHOVELS are playing a big part in the war against the Axis. And from this most exacting of "proving grounds" will come features which will be even more outstanding than those for which MICHIGAN has long been famous—improvements to help you keep costs at a minimum in meeting post-war competition.

Write for complete specifications given in  
Bulletin CE-93

AIR CONTROLLED

**MICHIGAN**  
POWER SHOVEL CO.

**BENTON HARBOR, MICHIGAN**

## Army Air Field Streets Paved with Plant-Mix

(Continued from page 1)

### lowing composition:

Screned gravel passing a 1-inch screen and retained on 3/4-inch screen	1,065 lbs.
Screned gravel passing a 3/4-inch screen	1,800 lbs.
MC-4 asphalt	135 lbs.

A total of 12 trucks was used to haul 4 batches, or 12,000 pounds, per load from the batching plant to the field.

The trucks dumped the hot-mix material in piles approximating 1 ton per 9 square yards of road surface, and these were spread by a Caterpillar No. 11 diesel dual-wheel power grader in sufficient depth to produce a 2-inch compacted mat. The initial rolling was done by a 48-inch 4-wheel 3 1/2-ton Fordson roller immediately after the material was bladed to the required cross section. This served to seal the surface against rain and foot traffic. The final rolling was done after the mix had become sufficiently compacted to support the weight of an old 8-ton Kelly-Springfield tandem steam roller without marking the surface.

### Seal Coat

A minimum of fourteen days was allowed between the final rolling and the sealing of the oil mat. During this entire time the road was under traffic. The seal coat consisted of RC-2 asphalt applied by a pressure distributor at the rate of 0.25 gallon per square yard at a pressure of 35 pounds per square inch and a temperature of 140 degrees F. This was covered immediately with limestone chips, all of which passed a 3/8-inch sieve and were applied by a Burch Chip-It-Over spreader at the rate of 15 pounds per square yard. The chipped seal was immediately rolled by an 8-ton Buffalo-Springfield tandem roller and traffic permitted to use the road immediately thereafter.

### Personnel

The paving of all streets and roads at this Army air field was done by contract under the direction of the U. S. Engineer Department. In the interest of national security, mention of the location of and personnel connected with U. S. Army construction is omitted.

### For Your Post-War File

Here are some additional pamphlets and reports on various phases of post-war planning which you may like to have in your post-war files. This supplements and continues our first listing. (See C. & E. M., July, 1943, page 60).

6. "Plan Now for Future Public Works", 18 pages, 6 x 9 inches: a statement by the Construction and Civic Development Department Committee of the Chamber of Commerce of the United States on the importance of communities' planning now for post-war public-works construction. Available gratis from the U. S. Chamber of Commerce, Washington, D. C.

7. "Let's Tackle the First Post-War Problem Now", 16 pages, 9 x 12 inches: Reprint of an article by Roy A. Foulke, Manager of the Specialized Report Department of Dun & Bradstreet, Inc., from the May, 1943, *Dun's Review*; discusses the problem of maintaining financial soundness and economic stability when V-day comes, how management can protect the operations and standing of companies when war contracts are terminated, and suggests some remedies to the situation. Available from Dun & Bradstreet, Inc., 290 Broadway, New York City.

8. "Post-War Planning for the Construction Industry", 25 pages, 8 1/2 x 11 inches: a statement of the need, objectives and procedures of a program to prepare the construction industry to do

its full part in maintaining full employment in the post-war period, published by The Producers' Council, Inc., 815 15th St., N. W., Washington, D. C. Single copies are available gratis; additional copies are 10 cents each.

9. "Demobilization and Readjustment", 106 pages, 6 x 9 1/4 inches: report of the Conference on Post-War Readjustment of Civilian and Military Personnel set up by the National Resources Planning Board in July, 1942. A broad study covering the transition period following the war as it affects both military and civilian personnel and setting up a framework for a more detailed and precise structure. May be secured from the Superintendent of Documents, Washington, D. C.

10. "Some Unfavorable Factors", 22 pages, 5 x 7 1/2 inches: Bulletin No. 3 in the Post-War Readjustments series being published by the U. S. Chamber of Commerce. A discussion of the difficulties to be faced in the post-victory period, some of which are delay in the reconversion process, international trade un-

certainities, and how to sustain investment to provide outlets for savings and create output, and suggestions for several forward steps to solve these problems. Available from the Chamber of Commerce of the United States, Washington, D. C.

11. "Maladjustments in the Post-War", 22 pages, 5 x 7 1/2 inches: Bulletin No. 4 in the U. S. Chamber of Commerce's Post-War Readjustments series. A discussion of the causes of maladjustments in the economic structure, with a view to mitigating them in the post-war period. Available from the Chamber of Commerce of the United States, Washington, D. C.

12. "Absorbing the Total Labor Supply", 30 pages, 5 x 7 1/2 inches: Bulletin No. 5 in the U. S. Chamber of Commerce's Post-War Readjustments series. A discussion of the problem of jobs for all at good real wages, raising some pertinent questions on how best to attain that goal. Available from the Chamber of Commerce of the United States, Washington, D. C.

### One for All and All for One

This motto of the Three Musketeers might well be borrowed for the National War Fund. The money contributed to it serves not only our own USO and United Seamen's Services, but also the relief agencies of China, Holland, Belgium, Russia, Norway, Greece, Poland, Yugoslavia, and France. By giving to the Fund, you give to all of these worthy causes, a true democracy of human kindness.

### C. H. & E. CONSTRUCTION EQUIPMENT

#### Three Ton Tandem Roller

For patch work. Operates same as automobile, slow forward and reverse speed, controlled by one hand lever. Both front and rear rolls can be filled with water. Easy to load on a truck for transportation from job to job.

Write for Bulletin 3810 N. Palmer St.



C. H. & E. Manufacturing Co.  
Milwaukee, Wis.



## "Old friend... fine wire rope"

Several thousand miles to the west of where you're reading this, an American face lights up as a welcome friend from home arrives.

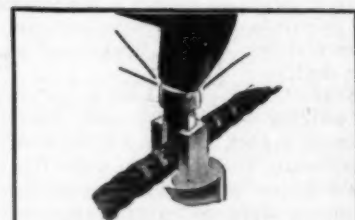
Back here in the States, like thousands of others now in uniform, he learned the friendliness of dependable Wickwire Rope.

He knows *you* need Wickwire Rope, too, to keep things running on the home front. So he appreciates *your* contribution in making the rope you



already have last longer, so more can be spared for the important work over there. But when you *do* order, won't you take it in coils when the lengths permit—so the handier reels can go to the front? Wickwire Spencer Steel Company, 500 Fifth Ave., New York.

For outstanding production accomplishments, Wickwire Rope was the first in all New England to win the coveted Maritime M and Victory Fleet Flag.



WHEN CUTTING WIRE ROPE, seizing is important, whether it is pre-formed or standard lay. The free book "Know Your Ropes" will help your new men (old, too!) learn the right and wrong ways to care for and handle wire rope to make it last longer. Send for your free copy.

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER



# WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City



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## Some Important Facts On Causes of Accidents

(Continued from page 13)

1. Backing and turning machines, swinging booms, lowering buckets, etc., without looking, warning, or signaling.
2. Getting on or off equipment unsafely, unauthorized riding, etc.
3. Defective mechanisms—timing, brakes, clutches, cables, etc.
4. Working or walking under skips, buckets, loads.
5. Failing to retard spark, grip handle correctly, stand correctly, etc., in cranking.
6. Oiling, adjusting, or making repairs, without stopping machines.
7. Unguarded or inadequately guarded fans, gears, etc.
8. Insecure grip, too heavy load, lifting with back, etc., in handling by hand.

### Some Important Accident Facts

Operating equipment without warning, signaling, or making sure that workers were in the clear was a factor in one out of five accidents. Reports indicated a general lack of responsibility and procedures for controlling movements of equipment. Devices or means for warning workers were seldom provided. Signalmen were not posted, instructions about safe procedures were not given, and existing rules were not enforced until after accidents happened. Signals and instructions were often confused. When several employees were working together, one was not specifically designated to give all signals. Verbal instructions were not repeated.

Slipping and falling in getting on and off standing or moving equipment resulted in one-eighth of all injuries, which varied in severity from strains to deaths. The worst accidents happened in getting on and off moving tractors, wagons, and railroad cars. Serious injuries were sufficiently numerous to justify the strict rule that only designated employees be permitted to ride on mobile equipment. Unauthorized riding on railroad cars frequently resulted in a fatality and strenuous efforts should be made to stop the practice. However, most injuries happened in getting on and off stationary equipment. Jumping off was one of the worst practices, resulting in injuries ranging from a severe strain to a fractured spine.

According to reports, inadequate maintenance caused 10 per cent of the accidents. The parts which require especially close inspection and better maintenance are brakes, cables, timing and starting mechanisms. The worst injuries were due to defective brakes and worn cables, but other parts which were involved in accidents and should not be overlooked in making inspections were clutches, clamps, hooks, and similar devices.

Training workers to keep in the clear in walking or working near moving tractors, cranes, and similar equipment is necessary for eliminating the fourth of the major causes of heavy equipment accidents. Injuries from this cause were far more numerous in hooking and re-

leasing loads than in doing other jobs. The men failed to step back a sufficient distance while loads were raised and to stay back until they were lowered. The number of serious accidents proves that the extra effort to get in the clear in working on elevations or in close quarters near swinging loads, buckets and booms is worth the trouble. Workers should be taught to keep away after hitching or hooking chains and cables onto logs, or around pipe, machines, or other materials. When the loads are pulled, the cables sometimes slip, the hooks pull out or the load swings, and nearby workers are struck.

Unsafe practices in cranking motors ranked fifth in the list of causes. Cranking is the largest single source of injuries in the operation of tractors and similar equipment. Accidents were due to failure to retard the spark, grip the handle with the thumb along the forefinger, stand correctly, and other unsafe practices. One-half of the injured workers sustained fractured wrists and arms.

Working on or near moving parts of machinery is one of the principal unsafe practices causing permanent disabilities in most industries. In operating general construction equipment, it is sixth among accident causes. Injuries were exceptionally numerous in operating concrete mixers. Most of the remaining accidents occurred in oiling and repairing draglines, power shovels, and cranes. The average lost time per

injury was large, 241 days, excluding fatalities. The most hazardous moving parts were cables, according to reports, as riggers, oilers, operators, and repairmen were caught while freeing, adjusting and repairing cables near sheaves and pulleys. The men took hold of the cables just ahead of the sheaves and their hands were jerked into them or in some cases the drums were turning too

(Continued on next page)

## When Winter DECLARES WAR

be READY with your  
DAVENPORT-FRINK SNO-PLOWS



It won't be long now—until the annual struggle with snow calls for prompt and efficient action in keeping the highways OPEN. Check over your Sno-Plow equipment. If you need maintenance and repair parts, it will help you and ourselves if you place your orders EARLY. We will do everything we can to get the parts to you on time.

**DAVENPORT BESLER CORPORATION** Dept. A  
DAVENPORT, IOWA  
Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK

THE SATURDAY EVENING POST

August 14th, 1943



### Short circuit on America's busiest assembly line

A SHUDDERING JOLT, a careening lurch in darkness, and a truck laden with vital supplies crashes into the ditch...

Instantly, an important link system—the nation's busiest—out like a blown fuse, all break in the pavement. This means...

### ... and all because of road failure!

The Barrett advertisement above, clipped from The Saturday Evening Post, emphasizes the vital importance of maintenance and repair to keep America's war-time highway system in first-class fighting trim.

It points out that despite gasoline rationing, America's roads are actually wearing out faster today than in peacetime. Right now, with truck traffic up more than 40 per cent—with 4,500,000 trucks transporting raw materials and finished goods—this country's highways are doing extra duty

day and night.

That is why road officials and engineers are making maintenance the keystone of their current programs. Worn roads can cut down production schedules, waste vital man-hours, menace national safety and cause costly damage to automobiles and tires.

Why not discuss your maintenance problems with the Tarvia field man? There's a right type of Tarvia for the repair and maintenance of almost every type of road.

## THE BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK

New York • Chicago • Birmingham • St. Louis • Detroit • Philadelphia • Boston • Providence  
Rochester • Minneapolis • Cleveland • Columbus • Toledo • Youngstown  
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**Barrett**  
**Tarvia**

\*Trade-mark Reg. U. S. Pat. Off.

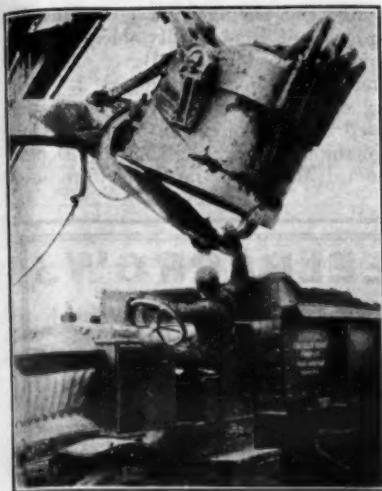
**Carey Elastite**  
EXPANSION JOINT

Standard in Concrete Construction for 31 Years  
ECONOMICAL and EFFICIENT

Asphalt Joint  
Fiber Joint  
Sub-Grade Felt

THE PHILIP CAREY MFG. CO.

Dependable Products Since 1873  
LOCKLAND, CINCINNATI, OHIO



Get in the clear, out of the path of the bucket during loading.

## Job Accidents

(Continued from preceding page)

fast and the guiding was done with the hands instead of with a bar. One-third of all accidents in working on moving parts involved cables, pulleys, and sheaves. The other outstanding source was moving gears, on cranes, shovels, and draglines, in which gloves, loose clothing, or rags were caught. Serious injuries also occurred in cleaning conveyors, oiling, and cleaning around motor fans, and cleaning and working around skips and blades of mixers without first stopping them.

Inadequate guarding caused 6 per cent of the injuries and was seventh in importance. Most of the injuries were due to unguarded gears on power shovels, mixers, and cranes, although other unguarded parts were motor fans, platforms on crushers, mixers, etc., sprockets and chains, and belts and pulleys.

While injuries due to unsafe handling of materials and machine parts were generally less serious than those resulting from other unsafe operating practices, they were a substantial proportion of the total. Hernias and other bad strains, as well as leg and foot injuries, incapacitated workers for considerable periods. Strains occurred under various circumstances. A few employees overestimated their ability to carry heavy objects; others attempted to lift heavy parts while standing in an awkward position; but the principal unsafe practice was lifting with the back instead of the legs.

### Other Causes of Injuries

Injuries due to the lack of, or failure to use, proper personal protective equipment were eye, toe and hand accidents, comprising 4 per cent of all injuries involving general construction equipment. The most serious were fractured toes which could have been prevented by wearing safety shoes. Eye injuries, however, were twice as numerous as toe and hand cases, most of which could have been prevented by the use of goggles. Proper gloves would have prevented many of the injuries to hands in handling materials, or in working levers as in many cases the operators developed blisters which became infected.

Failure to block equipment or heavy parts caused a substantial number of accidents in making repairs and in operating cranes and draglines. Rollers, railroad cars, and other equipment were stopped on inclines without blocking, and before the work was completed, they rolled forward or backward and injured one or more men. Most accidents occurred in changing or repairing equipment. Heavy parts were not blocked or supported, fell, and caused strains, lacerated hands, and fractured fingers and feet.

The number and severity of accidents in driving tractors, self-propelled dirt-moving equipment, and similar machines over rocky or soft ground warrant more control over operations under these conditions. Operators struck holes in fields and roads and were thrown from the machines, sustaining fractured ribs and painful bruises. Reports ascribed the accidents to driving too fast for conditions, not watching ahead, and having hands on the spokes instead of in the proper position on the

rim of the steering wheel. Some night accidents were due to inadequate illumination.

Most injuries due to placing hands and fingers in pinch points occurred in attaching hooks to buckets. After a laborer on one job had two fingers crushed in this way, grasping the hook at the top was made standard practice. Other injuries were due to haste—signaling moves before the hooks were properly placed.

The outstanding feature of accidents at dangerous locations, such as the edges of high fills and near power lines, is their high severity and costly property damages, and the long delays which result. Injuries from contacting power lines were often fatal. It is specifically required that draglines and similar equipment must be operated at least 10 feet from power lines.

Unsafe practices in fueling motors and checking the water in radiators often caused painful burns, in addition to the injuries which were incurred in cleaning and oiling near moving unguarded fans.

The burns were caused by using gasoline for washing parts, fueling with the motor hot or running, lighting a match (Concluded on page 48)

## WON'T QUIT or cause time out



A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company

32-36 Dey Street  
New York, N.Y.

## Hayward Buckets



## "Take care of yourself, Dad"

Last year over 180 million man-days of productive time were lost through industrial accidents—many of them needless. Think how many tanks, ships, guns, planes those 180,000,000 man-days of work would have made! . . . Yes, dad—take care of yourself. Your soldier-son needs your factory production to win.

American Cable **TRU-LAY** **PREFORMED** WIRE ROPE is helping keep down accidents every day because it is a safer rope to use and handle. **TRU-LAY** **PREFORMED** resists kinking and snarling. It resists whipping; spools better. Worn, broken and chisel-sharp crown wires refuse to wicker out to jab workmen's hands. They remain in place, making **TRU-LAY** much safer to handle.

Use American Cable **TRU-LAY** **PREFORMED** for your next rope. Do everything possible to reduce lost-time accidents. America needs your full-time production.

**TRU-LAY**  
*Preformed*

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT, CONNECTICUT



ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & Cady Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . In Business for Your Safety

## "BICKNELL BETTER BUILT" PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

**BICKNELL MANUFACTURING CO.**  
12 LIME STREET ROCKLAND, MAINE

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## Missouri Improves Section of U.S. 40

(Continued from page 9)

ered with canvas by the driver before he started the haul to the paver. A Model L Allis-Chalmers tractor was used to move the cement cars.

### Pouring and Finishing

With only fourteen expansion joints on the job this contract takes the prize for eliminating this expensive and, we are sometimes led to believe, unnecessary item in concrete paving. Translode base contraction joints were used for the 50-foot spaced intervals. Missouri has pretty well convinced us that, with the type of soils, heavy clays, that abound in that state, the expansion joint is more of a detriment than an asset, as it permits the curling of the slabs at the joints and the pumping action of traffic to start. When once this pumping action starts, it is very difficult to stop, even with preventive mechanical mud-pumping. Contraction joints, planes of weakness, were placed every 50 feet, while the expansion joints were reserved for such locations as bridge ends and drop inlets. LaCleda center strip, a steel V-type strip, was set with a template from the forms to insure its centering in the pavement.

The "man" who dumped the batches at the Koehring 27-E paver was scarcely more than a stripling, but did his work effectively and saw to it that every bit of the cement that was in each batch section was cleaned out and reached the skip. The paver pulled a subgrade planer for a final check on the grade section and then three men shoveled out any excess earth cut by the planer. These men and one man specially assigned spread the eight rolls of subgrade paper to prevent the absorption of water by the subgrade from the green concrete.

Four puddlers worked in the mud ahead of the Blaw-Knox Ord double-screed tamping finisher. To strike off the concrete for the welded fabric 2½ inches below the top of the forms the paver used its winch to pull a heavy steel strike-off over the first layer of concrete before the finishing machine could operate. Then with the top layer of concrete in place, the finisher began its passes to work the concrete to a

smooth surface for the hand finishers to complete. Along the forms and at all joints the contractor used a Mall vibrator to eliminate honeycomb.

Behind the finisher came two hand finishers with wide flat long-handled floats to work out any possible high spots or to build up low areas that had been shown up by checking the slab with 10-foot aluminum straight-edges. Two bull-float men handled the 12-foot longitudinal float from a double rolling bridge followed by the two hand finishers who edged the sides and joints as required. One man handled the broom finish on the completed slab and the final operation, immediately after the water had left the top, was the spraying of the surface with Satisfaction, a new membrane curing compound that is blood red when applied.

Water for the mixing operation was secured from creeks along the work and pumped into a short pipe line by a Jaeger triplex road pump. The paver carried 150 feet of 2-inch hose so that the 300-foot spacing of the water-line

valves was adequate.

### Personnel

The contract for the construction of this 1.2 miles of 22-foot concrete pavement, Project SN-FAGH 235C(2) and D(2) and SN-FAP-235C(3) was awarded as part of the general grading,

bridge and paving contract to Otto W. Knutson of Kansas City, Mo., and the paving subbed to the Davis Construction Co. of Boonville, Mo. G. J. Stoelting of the subcontractor's organization acted as Superintendent on the paving. For the Missouri State Highway Department, J. M. Karsch was Project Engineer.

## AMERICAN WHEELBARROWS

With Steel Wheel  
for WAR ORDERS



Write  
for  
Bulletin

Barrow shown is the American No. 1—4 cu. ft. struck capacity DeLuxe Concrete Wheelbarrow available with steel wheel.

Code with steel wheel.....  
.....PERFECT-S

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

in 1939

A SNOW BLOCKED ROAD WAS  
A NUISANCE . . .

in 1943

A SNOW BLOCKED  
ROAD IS A CALAMITY!

1943's transportation is drawn tight. It must equip fast-moving armies in a split-second schedule. Raw materials and supplies must flow to industry. Food and fuels are on a hand-to-mouth basis. Any delay caused by snow blocked roads means acute loss. It's up to you to clear the way.

Remember this when you check over your snow removal equipment. Be ready to cope with the worst winter conditions, by equipping with Walter Snow Fighters. They plow through the deepest drifts and

travel icy surfaces where other trucks vainly churn their wheels — they work faster than any other equipment, because of the great power-plus-traction of the exclusive Walter Four Point Positive Drive.

Walter Snow Fighters are specially designed and built to withstand the grueling work of snow removal and have mechanical features found in no other truck. Write today for detailed literature outlining the many advantages of Walter Snow Fighters.



...order  
**WALTER  
SNOW FIGHTERS**

Now!

WALTER MOTOR TRUCK CO., 1001-19 IRVING AVE, RIDGEWOOD, QUEENS, L. I., N. Y.

USE  
**TARPAULINS**

Order Now!  
**QUICK SERVICE  
NO PRIORITIES  
NEEDED**

Speed construction. Protect vital materials in all sorts of weather. FULTON TARPULINS will give you maximum satisfaction. Contractors Supply Dealers in every state sell the FULTON line. Specify SHUREDRIY and FULTEX. FULTON products are good and prices are right. If your dealer can't supply you, write our nearest plant for catalog, samples and prices.

Fulton Bag & Cotton Mills

Manufacturers Since 1870  
ATLANTA ST. LOUIS DALLAS  
MINNEAPOLIS NEW YORK NEW ORLEANS KANSAS CITY SAN

### Special Colloidal Graphite Increases Equipment Life

A new 4-page illustrated bulletin on "dag" colloidal graphite has recently been issued by the Acheson Colloids Corp., Port Huron, Mich. This bulletin discusses the use of "dag" colloidal graphite as a treatment for asbestos packing, clutch facings and brake linings to increase its lubricating properties. Such packing for steam engines, pumps, and other machinery, facings and linings, when so treated, do not squeal or chatter and, the bulletin states, wear is materially reduced.

To impregnate such materials, all

that is necessary in most cases is to dip them in the liquid in which the "dag" colloidal graphite is dispersed, although in some instances a wetting agent is desirable.

Copies of this bulletin, No. 431-Y, discussing the many uses of "dag" colloidal graphite for impregnation of materials may be secured by those interested direct from the manufacturer.

### The Million-Dollar Highway

Engineers are famous for their ability to improvise needed materials from those they find at hand. However, to build a connecting road from one of the

air fields into the capital city of Paramaribo, Dutch Guiana, the Army Engineers acquired a Midas touch, according to a recent issue of *Army News*. Mahogany timber and high-grade aluminum ore were the cheapest and most readily available materials. The finished road, therefore, which was completed in record time, has a corduroy base of mahogany logs surfaced with aluminum.

The Engineers call it the Million Dollar Highway and like to think that the streets of Heaven, traditionally guarded by United States Marines but designed and built in gold by the Army Engineers, won't seem too unfamiliar in contrast.

### Ransome 14-S Mixer Instruction Manual

A new 100-page instruction manual covering the operation and maintenance, and including a parts list, of Ransome 14-S Model U concrete mixers has recently been issued by the Ransome Machinery Co., Dunellen, N. J. This book, 6 x 9 inches in size, contains helpful information for use by operators who wish to conserve their mixers and to aid owners in getting maximum performance.

A copy may be obtained by writing to the company, mentioning this item, and asking for 14-S Parts List No. 315.

**REMODELING THE MAP with Cedarapids**

**Proved from ALASKA to MEXICO by MORRISON-KNUDSEN CO.**

**DOWN** America's long Pacific Coast Line the map is changing. War Birds Nests—landing fields that were never there before mark strategic locations for America's protection.

War time construction is high pressure construction—the toughest possible test on man and machine. It is significant that Morrison-Knudsen of Boise, Idaho, a firm that bases its purchase of machinery on the job to be done, has bought Cedarapids Portable Crushing Plants again and again. From far flung Alaska to the plains of Mexico Morrison-Knudsen has been building war

birds nests with Cedarapids plants. And Morrison-Knudsen is just one of the many well-known outfits that have been getting big output out of Cedarapids plants and who have bought more than one Cedarapids portable crushing plant.

Remember a repeat order buyer is a satisfied buyer. Tomorrow when peace makes the advancement and expansion of your own business possible, remember that Iowa Cedarapids plants are both war and peace time tested by the Nation's leading contractors. Come to Headquarters for aggregate producing equipment.

**IOWA MANUFACTURING COMPANY**  
Cedar Rapids, Iowa

**Built by IOWA**

**ALASKA**  
**IDaho**  
**OREGON**  
**ARIZONA**  
**CALIFORNIA**  
**MEXICO**

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### Earth-Moving, Snow-Removal Units Described in Catalog

The complete line of LaPlant-Choate equipment for earth moving, land clearing, and snow removal is described and illustrated in a 16-page catalog issued by the LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa. Included in the line are four sizes of Carrimor cable-operated dirt-moving scrapers, the high-speed long-haul CW-10 tractor scraper, sheeps-foot tamping rollers, rippers, cable and

hydraulic-controlled trail-builders and bulldozers. Land-clearing units include treedozers, brushcutters, weed eradicators, stump splitters and root cutters, while for snow-removal operations LaPlant-Choate's line of hydraulically operated snow plows are designed for tractor mounting.

Copies of this LaPlant-Choate catalog may be secured direct from the manufacturer by asking for Form No. A-265-675 and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

### Clukies Joins Robins

Announcement has been made by Robins Conveyors Inc., Passaic, N. J., manufacturer of materials-handling machinery, of the appointment of Francis O. Clukies to its sales staff to specialize in the products of the Mead-Morrison Division. Mr. Clukies, who was associated with the Mead-Morrison Mfg. Co. for some 30 years before Robins bought out the materials-handling business of that company, will make his headquarters in

Robins' New York office at 70 Pine Street, New York City.

### Welding Check Charts

The three essentials of proper welding procedure, correct electrode, correct travel speed, and correct welding current, are graphically illustrated and discussed in two wall charts which may be secured from Hobart Bros. Co., Box CE-73, Troy, Ohio, for 10 cents to cover the cost of mailing.



# 200 TONS PRESSURE!

Rodgers Universal Hydraulic Presses have been purchased by many large industrial shops equipped with large stationary presses. Engineers and shop superintendents recognize the advantage of having a powerful portable press to take to the repair job.

Ask your mechanic what he thinks of press equipment that can be used in any place and in any position where pulling, pressing or lifting power is needed. The Universal Press is portable and can be carried to the job and assembled around the work.

Illustrated below is a 200-ton unit, removing bearings and sleeves from pitman of a Diamond Iron Works Crusher, the job requiring 237 tons pressure. *If it's a Rodgers, it's the best in Hydraulics...* Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minnesota.



Manufacturers of: Universal Hydraulic Presses - Track Press Equipment - Hydraulic Keel Benders - Hydrostatic Test Units - Power Track Wrenches - Hydraulic Plastic Presses - Portable Straightener for Pipe and Kellys

# Rodgers HYDRAULIC Inc.

## Lubrication Important In Care of Hand Tools

(Continued from page 18)

Keep the ventilating system clear by blowing compressed air through the tool—first in the rear slots, then in the front slots—with the motor running. Do this regularly and frequently, especially if the tool is working in dusty air. This will eliminate one cause of grounding and damage to motor and bearings. Some operators like to cover the vent holes with adhesive tape so that the exhaust air will not blow on them. Obviously this defeats the very principle of the vent holes and causes overheating.

### Lubrication

Correct and adequate lubrication is the most important single factor in determining the life and service of your electric tools. Lack of lubrication is the greatest cause of failure. All tools are properly lubricated before leaving the factory, and should be lubricated regularly thereafter in accordance with manufacturers' instructions. Tools used constantly on production or other heavy-duty jobs will need relubricating more often. Tools "out of service" for long periods should be relubricated before being put back to work.

Investigate carefully all claims for "permanent lubrication", and be sure you understand the exact interpretation of these claims. In some tools, the ball bearings are of the grease-sealed "closed" type, with both sides of the bearing sealed either with two plate seals, one plate and one felt seal, or with two felt seals. These are permanently lubricated and have sufficient lubrication packed in them at the factory to last the life of the bearing. Do not immerse closed bearings in solvent, as this will dilute the lubricant. Wipe them clean. In open-type ball bearings, having no seals of any kind or but one plate seal, the balls and ball retainers are visible; these bearings are not lubricated to last the life of the bearings.

Always wash all old grease from gearcase, gears, and bearings with a good grease solvent before refilling with fresh lubricant. Never fill the gearcase more than half to three-quarters full; too much grease is as bad as too little. Grease expands when warm, and the excess will be forced through the bearings into the motor, damaging the windings and clogging the ventilating holes. The gears should be lubricated every three months. The proper grade of lubricant should be used in all greasing. This is specified in the manufacturer's instruction book, or is furnished by him, and should always be used.

### Motors and Accessories

Electric hand tools are equipped with motors furnishing plenty of power and overload capacity far in excess of ordinary requirements. However, should the tool bind or stick so as to stall the motor, the current should be turned off immediately and the tool worked free or nearly free before turning the current on again. Overloading the motor may burn out the armature, wear out the carbon brushes, or do other damage to the tool that will require factory repairs, and hence will cause delay on the job.

The commutator on the armature should be inspected whenever the tool is taken apart for cleaning or repairs and every time a new set of brushes is put in. If the surface of the commutator is uneven, or if a groove is cut where the brushes have been traveling (which will be the case after long and continuous service), the armature should be taken out and the commutator trued up. If there is no groove, but the surface of the commutator is blackened and burned by sparking (which may be caused either

by worn-out brushes, by brushes being stuck in the holders, or by overloading), it will also be necessary to true up the commutator.

Motor brushes should be checked regularly for spring tension and length of carbon. Worn brushes should be replaced immediately with brushes furnished by the manufacturer of your equipment. These brushes vary widely as to hardness of carbon and spring tension, and the use of "just-as-good" brushes may do irreparable damage to your motor.

When a new set of carbon brushes is installed in an electric tool, the commutator should be smoothed down with a piece of fine sandpaper to give the new brushes a clean surface. These new brushes have a flat end surface, which will wear down in a few minutes to a concave surface, after which the sparking will stop. Brushes on an electric tool should be watched and not allowed to wear much below half their length because the spring tension is decreased as

(Continued on page 42)

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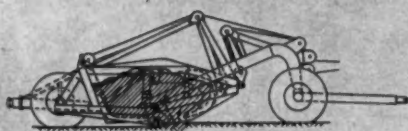
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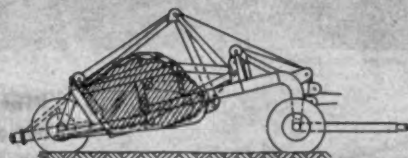
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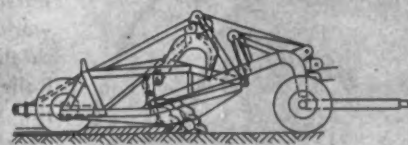
### LESS POWER TO LOAD



(1) LOADING POSITION



(2) CARRYING POSITION



(3) DUMPING POSITION

GW Cable-Controlled Scrapers provide three ways to speed-up earth moving, do the job in shorter time—and "clear the way" to Victory!

Illustrations, left, show the loading, carrying and dumping positions. When loading (1) the line of draft is located to prevent the cutting edge from being pulled out of the ground. Weight is evenly distributed. Boiling action of dirt, loads the bowl and gate with a minimum interference of the material already loaded. In the carrying position (2) the high center clearance of the cutting edge is ideal over soft or uneven ground.

Front portion of load dumps (3) by raising the apron. Remainder of the load is forced out efficiently by positive rolling ejection, as the bottom of the bowl reaches a steep angle, resulting in less cable wear. Wide space between cutting edge and apron permits dumping large sticky loads without interference. The cutting edge remains fixed while dumping, thus providing accurate control of depth of spread.

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## Wartime Difficulties Of Winter Road Work

(Continued from page 1)

### Difficulties To Be Faced

Highway department officials charged with the responsibility of maintaining the arteries of the nation's transportation system this winter are faced with mounting difficulties. First there is a serious shortage of snow-removal equipment. Only a limited number of new machines are available and those on high priority. Many of the snow-removal units owned by departments of state or local government have been commandeered by the Army and Navy for use at new airports, at munitions centers, at training camps, on the Alaska Highway, and at far-flung northern outposts of the fighting fronts.

The second big difficulty in removing the snow from the nation's roads this winter is a serious and growing shortage of skilled operators. The draft has taken many of the younger men; many have enlisted in the Seabees and in the Army Engineer Corps; while still others who are experienced in truck, motor-patrol, tractor or rotary snow-plow operation are now employed on military construction projects in this country or abroad.

The highway engineer who recognizes the importance of his task this coming winter and the complications which might result from the combination of an over-age piece of equipment in inept hands would do well to start the formulation of a comprehensive schedule of operational instruction and equipment maintenance at the earliest possible time.

### Training Operators

During wartime, the operator of snow-removal equipment becomes more important than ever before. Preventive maintenance begins with the operator and, while a careful employee may prolong the life of a machine, carelessness or inexperience may easily wreck an otherwise carefully planned program.

Driving a truck on a grading job during the summer is little qualification for operating a heavy-duty truck with V-plow and wings on icy and drifted winter roads. If the employee is not familiar with snow-removal equipment, let him say so, and then make it *your* job as an engineer to acquaint him with proper

operation and accepted methods of snow removal.

Illustrative of poor operation and damaging methods of snow removal is "drift bucking", a practice in which many experienced hands who should know better indulge, along with the green operators. "Drift bucking" is simply approaching a snow drift head-on and at high speed. It is one of the most destructive methods of snow removal as far as the equipment is concerned. Even the most carefully engineered machine simply will not stand up to hitting the drifts at high speeds hour after hour in zero or near-zero temperatures. Two plows in tandem will break through faster and with proportionate lessening of the impacts which cause stress and strain on the machine's vital working parts. In addition to conserving equipment, tandem plowing accomplishes a more thorough job, pushing the snow well off the highway and opening more miles per day.

In spite of all the care given a machine in the shop, an operator, through care-

less or inefficient operation, in a few hours may do damage that will take days to repair. Any manufacturer will gladly furnish a manual of recommended operations which, bulwarked by the practical experience of most maintenance engineers, will suffice to give the new operator a sound background. With a little time and study and the assistance of the local equipment distributor, an engineer can complete a concise sheet of "Do's and Don'ts" for the guidance of operators.

Such instructions in proper methods of operation are beneficial not only to the new employee, but to the experienced operator as well. There are few who can't learn two or three new machine-conserving tricks.

### Preventive Maintenance

Every unit of snow-removal equipment which moves from the shop onto the highways after the first storm of the winter has, theoretically at least, been completely checked and serviced and is in condition to give good perform-

ance. Application of a few common-sense precautions in the form of preventive maintenance will keep the unit

(Continued on next page)



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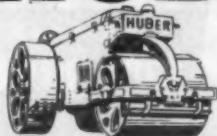


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## Care of Equipment Aids Snow Removal

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in good operating condition throughout the winter.

Although there are many specific checks and services which must be performed on the different units of snow-removal equipment, there are a few general maintenance measures which apply to almost all equipment used in winter-maintenance work.

In all snow-fighting machines—tractors, trucks, patrols and rotaries—proper care of the engine ranks high in the order of "musts". While modern motors are engineered to give a maximum of service with a minimum of attention, negligence in a simple matter may seriously damage the entire complex system. Take the cooling system, for example. It is imperative that the entire system be kept clean at all times. When anti-freeze solution is used, the water pump, hose connections, and cylinder heads should be checked to be sure there are no leaks. Anti-freeze leaking into an engine will contaminate the oil, cause sticky piston rings, and damage other engine parts.

In some areas, water has a high alkali content or contains other harmful impurities. If pure water is not obtainable, rain water may be used in the cooling system, or a combination of water with a low alkali content and a water softener. Engine temperature on equipment used during the winter should be controlled with a radiator hood or an automatic shutter.

Serious damage may be done to the engine when starting in cold weather. Before attempting to start, check the engine to be certain that it is in readiness. The starter should not be operated continuously for more than 25 or 30 seconds. If the motor does not start, the battery and starter should be allowed to cool off before attempting to start again. After the engine has been started, don't run it at full throttle until the motor is running smoothly.

Batteries must be kept in good condition. They should be inspected regularly to be sure they are filled with pure water. The hydrometer reading should not fall below 1.225. Cables should be checked at the same time the battery is checked to make certain they are in good condition.

### Proper Lubrication a "Must"

For winter operations, a lighter lubricant than that used in summer is a "must". If a light-viscosity oil isn't available, heavy summer oil may be used only if it is cut with kerosene.

When operating diesel-powered equipment in extremely cold weather, it is important that the fuel contain a sufficient quantity of lubricant to prevent pumps and injectors from sticking. Under some conditions, it is wise to add a small amount of a light lubricating oil to each tankful of fuel. In cases of doubt, consult the dealer or manufacturer for his advice and assistance.

Proper and regular lubrication is perhaps more important to equipment than



This heavy-duty Walter truck on a South Dakota highway is equipped with cable-controlled V-plow and wings and takes the toughest drifts in stride.

any other phase of maintenance. Lubrication schedules for the different types of equipment vary, but manufacturers provide lubrication charts and these should be strictly followed. The trans-

mission is especially important. In a truck, not only is the life of the transmission and rear axle prolonged by proper lubrication, but the use of the proper-weight lubricant during cold

weather will prevent sacrifice of power that would otherwise be required to turn gears against a stiff ineffective lubricant.

### Cable Care

Perhaps the most generally used unit of snow-removal equipment is the plow or V-plow and wings mounted on truck, tractor or motor patrol. Some counties used bulldozers for winter-maintenance work. Frequently, blades, plows and wings on trucks, tractors and patrols are cable-controlled. On such units, proper attention to the best-suited type of wire rope is important as a preventive-maintenance measure.

The cables on these machines take the brunt of the punishment as the plows smash into drift after drift for 24 hours, 36 hours and even 48 hours without respite. In addition to the punishment of the shock, these cables must be able to withstand sub-zero fatigue. Because ordinary-type steel cable tends to become brittle in cold weather and will

(Concluded on page 58)

## "Engineering in Wood"

Today's *musts* in timber construction include blimp and airplane hangars, army depots, shipyards, cantonments, war plants of all kinds.

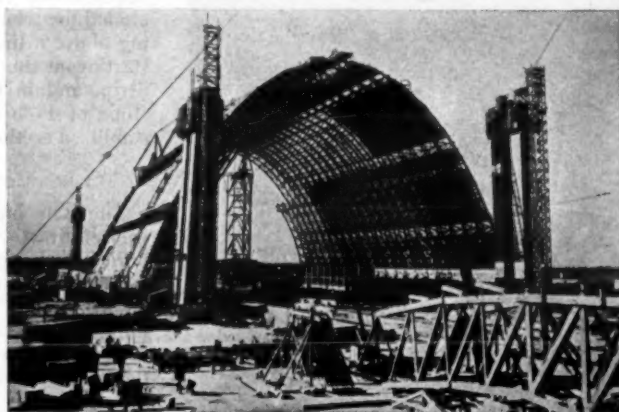
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**WAREHOUSE, 200'x300'** for Woodbury and Co., Portland, Ore. Roof trusses for this modern building designed, fabricated and erected by Timber Structures, Inc. Architect: Richard Sundeleaf, Portland. Contractor: Wegman & Son, Portland. Miles K. Cooper, Portland, Structural Engineer.



**PAN-AMERICAN HIGHWAY.** Bridges like this (50'-70'-90' lengths) were completed and shipped by Timber Structures, Inc. 18 days after order was received—15 days ahead of schedule. One bridge of each size was given a trial assembly for inspection purposes, then creosoted at Pope-Talbot plant, St. Helens, Oregon. Bridges designed by U. S. Engineers.

**PLYWOOD PLANT.** Peninsula Plywood Corp., Port Angeles, Wash. 90'-64' trusses were provided. Engineer: J. H. Stevenson. Contractor: A. S. Hainsworth Construction Co., Seattle.



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# Grading and Paving News

✦ **A NEW Flight Strip** for military aviation has recently been completed on the North Atlantic coast. With a full 4,000 feet of concrete runway 150 feet wide of 8-inch thickness, the project has a stabilized section of soil-cement 1,000 feet long at either end and subsurface drainage consisting of French drains and positive tile drainage. This latest aid to aviation will stand for some time as an example of good design and construction for the hundreds of Flight Strips to come for both military and civil aviation.

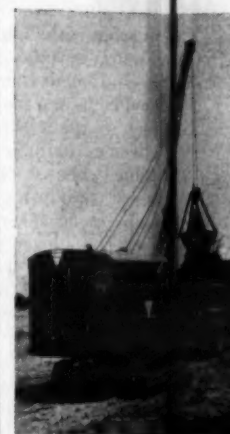
The project is located near a main east-west highway, in the direction of the prevailing wind. Loam shoulders 150 feet wide extend on either side of the runway with a strip 25 feet wide graded outside this area. The full right-of-way for this Flight Strip is 8,200 x 800 feet, all of which was cleared and an area 8,000 x 500 graded. Clearing also included the trimming of all trees projecting above a line with a slope of 1 on 7, starting at the center line of the Flight Strip, and in the approach zone on a slope of 1 on 40 from the ends of the stabilized sections for 2 miles.

## Design

The state highway department under whose direction this Flight Strip was built had the foresight to purchase extra right-of-way so that the runway could be lengthened if desired without later purchase of more land. The first step in design was a complete soil analysis of the area to determine the character of the subsurface area as to drainage possibilities and for the proper characteristics of soil for stabilization for the base of the runway. This saved considerable in the total cost of the project as well as in the borrow area where proper mixing of soils was effected almost automati-

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By THEODORE KEI



C. & E. M. Photo  
The Northwest and Mal  
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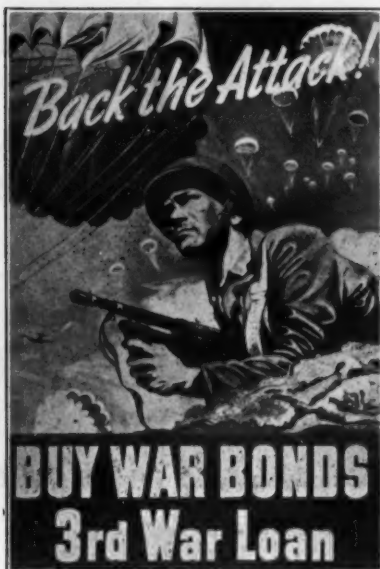
cally as described.

The 4,000-foot runway provides for the expansion of way for another 100 feet necessary without need for additional base. That would be the removal of inches to allow the extensive uniform concrete.

## From Chop to Pav

Clearing and going on the





### Army Engineers Praised For Jungle Construction

There have been many stories of the almost unbelievable exploits and accomplishments of the Army Engineers in building advance bases, hewing airfields out of virgin terrain, and generally performing the impossible. A tribute to their work has come to our attention in a personal letter from Lieutenant Roland C. Shaw of the U. S. Army Air Force, who is seeing action somewhere in the South Pacific. Lieutenant Shaw wrote to his father:

"This place is a typical tropical base with thick jungle from which the Engineers have done a remarkable job in hewing the necessary facilities for this base. It is a very reassuring thing to see the grand work which our construction battalions are doing out here. They go into the roughest country and put up miles of wires, roads, bivouac areas, etc. They really make a place livable, where uncivilized black men have lived a most primitive existence. You can be sure that our success in this war will be in large part due to the excellence of these construction men. And you cannot see all the cranes, tractors, bulldozers, trucks, and other equipment without appreciating the superiority of American enterprise and machinery. I've no doubt that we'll ultimately give our enemies a terrible beating."

The activities of the construction battalions of the Corps of Engineers offer

trained construction men an outstanding opportunity to do a real he-man job in helping to win the war. The Army Engineers are now asking for 100,000 construction specialists to provide the necessary facilities and advance bases to bring the day of victory closer. Provision has been made for voluntary induction or enlistment as a construction specialist in the Corps of Engineers at any U. S. Army Recruiting or Induction Center or any office of the U. S. Army Corps of Engineers. If you are between the ages of 18 and 50 and have had construction experience or can operate any type of construction equipment, why not volunteer now to put your skill and experience to work for victory?

### Diesel-Electric Units Aid Russian Industry

A new plan for replacing war-damaged power facilities of Russia's small war plants behind the lines by using a large number of small diesel-engine-

driven electric generating units was disclosed recently by H. N. Mallon, President, Dresser Mfg. Co. As a part of America's lend-lease program, the Clark Bros. Co. of Olean, N. Y., one of Dresser's divisions, is completing delivery of a \$4,000,000 order for diesel engines which represent a new development in the supercharged two-cycle field.

These engines are for electric generation and are a step toward Russia's piecemeal replacement of such power facilities as the famous Dnieperstroy Dam which the Russian Army blew up in the early days of German invasion rather than have it fall into the hands of the enemy. The Dnieperstroy's generating capacity was over 700,000 hp and represented one-tenth of Russia's total capacity. More and more power is needed for the country's war production, and America's lend-lease aid is not only supplying war materials but also new facilities to help Russia's own industrial production.

It is reported that, as an outgrowth of Clark's diesel-engine development, the

company has received a large order from the United States Government for marine engines of a similar type. In addition to the new adaptation of the supercharged two-cycle principle to the diesel field, the engine cylinder walls of these units are finished with a porous-chrome hardening process to prolong engine life. This process was developed by the Vander Horst Corp., also a member of Dresser industries.

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# Suspension Span For Peace River

**Temporary Timber Structure Gives Way to Permanent Bridge Eliminating Closing Of Alaska Highway by Ice**

By **RAYMOND ARCHIBALD**, Principal Structural Engineer, Public Roads Administration

THE temporary timber trestle bridge built last year across the Peace River near Taylor Flats in British Columbia on the Alaska Military Highway faced annihilation by ice from the day it was completed. At this crossing, 37 miles north of Dawson Creek, the railroad and southern terminus of the Alaska Highway, the ice attains a thickness of 4 feet, and when it "goes out", pieces as large as 700 x 2,000 feet break loose and start down the river. The stream was bridged last year by the temporary timber trestle, but to keep such a bridge in operation, it would have to be replaced as many as three or four times in a year. Conditions necessitated a rush job on the permanent bridge.

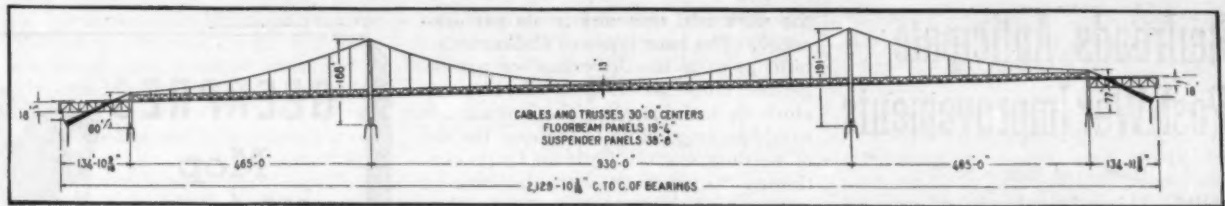
## Design

Due to the ice conditions and the deep foundations necessary, it was decided to place a single span across the main channel. A suspension bridge with a main span of 930 feet with loaded back-stay spans of 465 feet was selected as best suited for erection conditions. Falsework was out of the question. Two deck truss spans of 135 feet were interposed between the cable bents and the anchorages. The concrete slab roadway is 24 feet from curb to curb, and the curbs are 18 inches high.

The deck structure is suspended from two open-type parallel-strand cables. Each cable consists of twenty 2-1/16-inch strands, spaced approximately 4 inches from center to center, and held in position by the cable clamps at each hanger and at the saddles.

## Piers and Anchorages

Construction of the foundations for the piers was started early in December, 1942, and was carried on throughout the severe winter weather by a Canadian



The suspension bridge across Peace River, designed by engineers of the Public Roads Administration.

contractor. Intensive efforts were made to complete the two main piers in the river bed so that the steel towers might be erected before the spring break-up of ice.

Excavation for the main piers was carried approximately 50 feet below water level into a shale formation. Steel sheet piling was used in the cofferdams and the concrete was placed in the dry. Work was carried on simultaneously on both sides of the river with two complete outfits. Each main pier contains about 4,000 cubic yards of concrete, which was placed at temperatures as low as -40 degrees F. During this time the aggregates were preheated and the

necessary precautions taken to protect the concrete after it was placed in the forms.

The concreting of the anchorages was coordinated so as to have the cable-anchorage steel in place by the time the cables were strung. Each anchorage contains about 7,500 cubic yards of concrete so placed as to form cells that were filled with gravel. Large segmented blocks of concrete, keyed and interlocked, were poured.

## Main Towers Erected On Ice

It was decided to work on the ice in erecting the main towers. This meant that the bridge towers had to be erected

and the erection tower dismantled by early April, when the "break-up" could be expected. An erection tower, formerly used on a barge, was rigged to operate on skids on the ice.

The erection tower had a reach of 250 feet, sufficient to place steel at the top of the highest tower, which is 196 feet above the top of the pier. The erection tower was guyed back and, as it could not swing a load, it was "spotted" in front of the legs of the tower by skidding on the ice. After completing the south tower, the rig was skidded across the river on the ice into position for the north tower.

(Concluded on page 50)

## How ONE Contractor Paved 240 MILES of Runway Slab AT WAR SPEED

\*RUNS OF 300 LIN. FT. PER HR. OF 25 FT. WIDTH  
(9'-7"-9") WERE COMMON



USED TWO 34E DUAL DRUM  
PAYERS WITH ONE JAEGER TEAM

**THE RECORD:** In the first 18 months since Pearl Harbor, Koss Construction Co., Des Moines, Ia., completed 13 contracts for over 3,500,000 sq. yds. of concrete airport paving (more than 240 miles of 25 ft. slab)—all poured with 34E dual drum pavers followed by Jaeger Paving Teams (25 ft. Screw Spreader and Type "H" Finisher).

Two of these big pavers were often used with only one Jaeger Spreader-Finisher Team.

**THE REPORT:** Mr. Richard Koss states: "At no time has this Jaeger equipment failed to keep up with the production of two pavers and this includes all types of weather from the very hottest days to the coldest winter days that we poured concrete . . . In spite of the large amount of yardage laid, the machines are still in excellent shape."

**THE VERDICT:** For today's—and tomorrow's—paving needs (steady, high production with small crews) use the Mechanized Paving Team, originated by Jaeger.

## THE JAEGER MACHINE COMPANY

701 Dublin Ave., Columbus 16, Ohio

ALSO MIXERS—PUMPS—HOISTS—TRUCK MIXERS



VIBRATORY MIXES  
EASILY HANDLED

**JAEGER**

SCREW CONCRETE SPREADER  
TYPE "H" FINISHING MACHINE

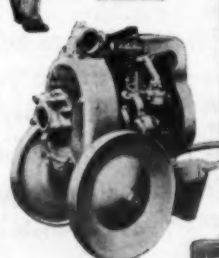
## the PUMPS that EXCEED their PROMISES



**JAEGER**  
"SURE-PRIME"



Portable  
3000 Gallon  
"Bantam"

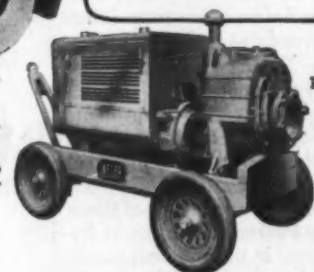


Above: 3" Heavy  
Duty Model

Right: 10" Port-  
able Pump

All sizes 1 1/2" to  
10"—Gas, Elec-  
tric, Diesel

Also Jetting  
Pumps



Patented "Prim-  
ing Jet"

Self-Cleaning  
Shells

Replaceable  
Liners

Longest Life  
Seal

Oversize Shafts

for Years the ONLY  
Pumps that have been  
Factory-Tested and  
Certified and Regularly  
Exceed Their Guarantee

- with up to 5 times faster, 100% automatic priming,
- with high air and water capacity under adverse conditions,
- with thousands of extra hours of trouble-free service.

**ON SALVAGE WORK AT PEARL HARBOR** (where Jaeger 10" Pumps of 40,000,000 gallons daily capacity worked constantly for 10 months) and thousands of other war jobs at home and abroad, Jaeger Pumps are "going places" for you and Uncle Sam. Your Jaeger dealer has them for sale or rent.

Repair Parts and Quick Service in Over 100 Cities  
**THE JAEGER MACHINE COMPANY**  
701 Dublin Avenue, Columbus 16, Ohio

# HOISTS

**STEAM • ELECTRIC  
GASOLINE • DIESEL**

**BELT DRIVEN**

• **FOR OVER 69 YEARS WE  
HAVE BEEN BUILDING FINE  
HOISTING MACHINERY**

• **OUR DUPLICATE PART SYS-  
TEM INSURES PROPER FIT  
OF OUR FACTORY BUILT RE-  
PLACEMENTS**

• **FOR THE DEFENSE AND  
OFFENSE WAR EFFORT  
KEEP YOUR PRESENT  
HOIST IN GOOD WORKING  
CONDITION**

*We can help you!*

*We proudly fly  
these flags*



**MANUFACTURING COMPANY**  
Main Office and Works ELIZABETH, NEW JERSEY

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## Railroads Anticipate Post-War Improvements

(Continued from page 2)

it all". This volume has been increased also by that part of highway transportation incapacitated by the limited supply of rubber; and finally, the last straw, which fortunately has not broken the camel's back, the added burden of transporting gasoline and fuel oil by tank car necessitated by the loss of tankers through the Axis submarine campaign and the diversion of tankers to military use in foreign fields.

All this has been done by the railroads without adequate replacement of locomotives and rolling stock, passenger or freight, or of operating equipment, and with a very real drain on its man-power by the need for railroad specialists in the armed services, and some loss to the war industries. So much for the contribution to the war by the railroads—now.

What have they publicly proclaimed as their plans, their contribution to the post-war years? Robert S. Henry, Assistant to the President, Association of American Railroads, writes us, "Each railroad is at work on its own plans, of course, while there is a general Railroad Committee for the Study of Transportation undertaking a study for the industry as a whole. That Committee, however, has not gone so far as to compile any specific information of the sort you have in mind.

"In general, I think it is entirely safe to say that after the war the railroads will continue development and improvement in the same general direction in which they have been moving for the past several years and which have so abundantly proved their utility, except that probably they will do more of the same, and do it better with the new materials and improved practices which will then be available."

Writing in *The Highway Magazine*, George M. Crowson, Assistant to the President, Illinois Central Railroad, stated that the railroads of this country will emerge from this war with, among other things, "further improvements in methods of operation and maintenance developed under the stress of the emergency, with material reductions in debt and established reserves of working capital to cushion the period of change, and with a carefully-worked-out and blueprinted plan for the post-war period covering every department of railroad-ing.

"These are present trends", Mr. Crowson continues. "If they are maintained for the duration of the war—and I believe they can and will be—they will go far to insure the position of the railroads after the war."

On the basis of reports received from other leading railroads throughout the country, it is apparent that the railroads, like many other industries, have committees and are studying future possibilities, but there is all too little evidence of any wide-spread concrete planning anywhere near the blueprint stage. The "wait and see what happens" school of thought, which apparently is preventing the preparation of definite plans and projects in other fields, seems to be influencing the railroads as well.

However, the Pullman Co., the very name being synonymous with travel, reports through its Vice President, George A. Kelly, a truly constructive program. While existing passenger-car plants are in excess of any possible demand so that material expansion of these plants, either by Pullman interests or by other car builders, is not contemplated, it is "probable that there will be a very considerable amount of expansion of the equipment within existing plants in the way of improved welding facilities and other tools to improve the character of

the work and economy in its performance". The later types of Pullman cars built prior to the "freezing" of passenger-car construction used welding exclusively in fabricating the structure. It would be impossible to increase the use of welding, but the Pullman Co. is continuing its research with the idea of improving welding technique as well as economy in performing the work.

### One Large Program

The Long Island Railroad, serving the great residential, manufacturing, and playground area of Long Island, running from New York City over 100 miles to Montauk Point on the eastern tip of the Island, employed the well-known J. G. White Engineering Corp. to make a survey of post-war developments for the railroad. The report covers improvement and modernization of the railroad property and equipment, plus 141 miles of electrification extension, in sections over a period of time to 1965. The proposed program will cost \$30,000,000

(Continued on page 62)

## GEERPRES Mop Wringer

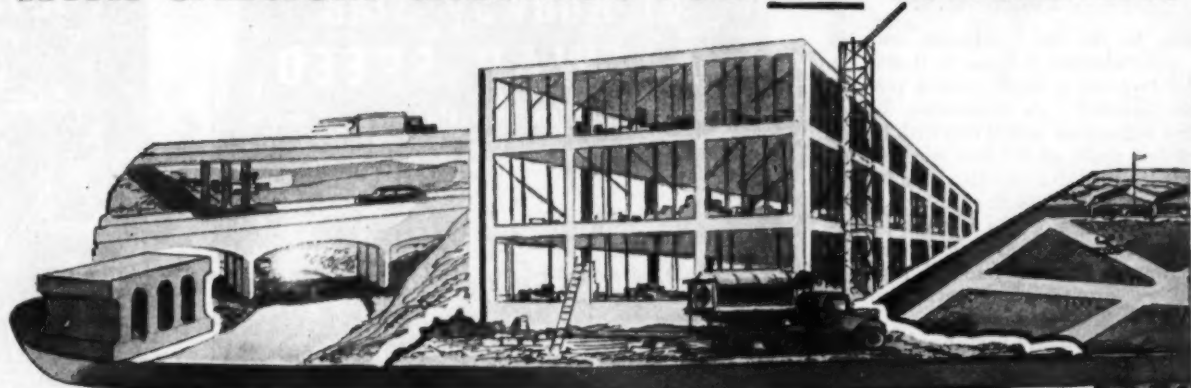
reduces mop costs from 25 to 50% over other methods of wringing—retains the mop fabric in a soft fluffy condition most desirable for rapid mopping. No more loose mop strings to catch around legs of desks and furniture when using GEERPRES.

New construction makes this wringer last for many years. Two popular sizes cover the entire commercial field. No. 1624 model will wring mops 14 to 24 oz. incl. No. 2436 model will accommodate mops 20 to 36 oz. incl. SEND FOR FREE CIRCULARS.

**GEERPRES WRINGER, INC.**  
Manufacturers of High Grade Mopping Equipment  
**MUSKEGON, MICH.**



## HIGH EARLY STRENGTH WITH CALCIUM CHLORIDE FOR ALL CONCRETING



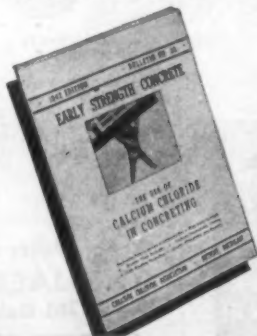
**M**ANY factories have reduced man hours of labor required to produce planes, ships and guns — sometimes 50% or more.

In war-urgent concreting it's "waiting hours" instead of "man hours" that hold up completion of concrete work. These waiting hours are reduced one-half to three-fourths by incorporation of calcium chloride in portland cement concrete mixes to produce higher early strengths.

Forms may be removed in half the time and succeeding courses placed earlier. Finishing may follow placing promptly to maintain work schedules — and the concrete containing calcium chloride has greater strength at all ages.

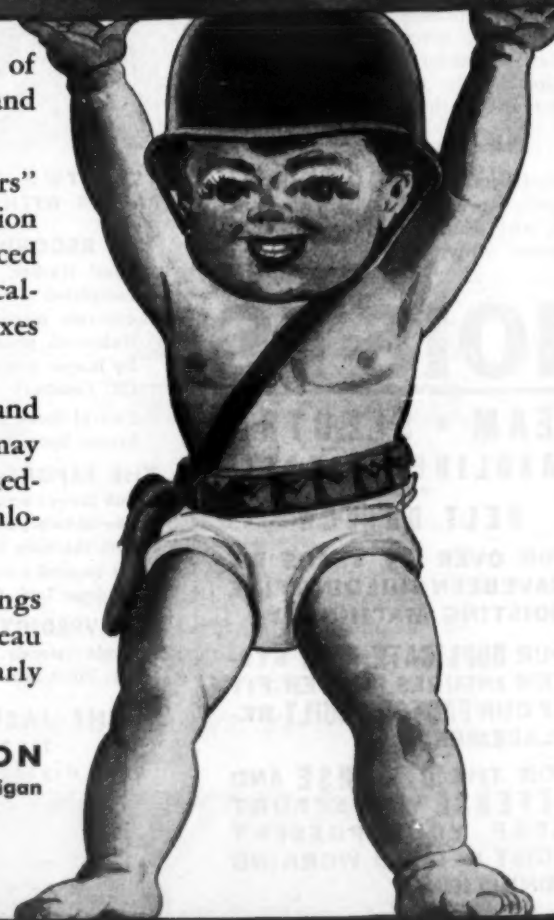
These advantages are confirmed in the findings of many years of tests at The National Bureau of Standards. Write us for Bulletin 28 — "Early Strength Concrete."

**CALCIUM CHLORIDE ASSOCIATION**  
4145 Penobscot Building Detroit 26, Michigan



## CALCIUM CHLORIDE

**SPEEDS YEAR-ROUND CONCRETE CONSTRUCTION**



### Light-Reflecting Floors Described in New Booklet

A new type of light-reflecting floor, which has been installed in many aircraft and other war plants, is described in a new 24-page booklet published by the Universal Atlas Cement Co., Chrysler Bldg., New York City. Built of concrete made with white portland cement instead of gray cement or darker materials, these floors become giant reflectors instead of absorbers of light. According to the

text, this increase in illumination helps to increase production, reduce accidents, boost morale, and preserve health.

The booklet also includes a section on recommended practice for the construction of these light-reflecting floors, a section on their surface treatment, and a section on the maintenance experience for one such installation, showing that they are easy to clean, encourage cleanliness, and retain their reflecting properties.

Copies of this booklet entitled "Light

from Floors Speeds War Production" may be secured by interested contractors and engineers direct from the company.

### Hydraulic Institute Revises Pump Tests

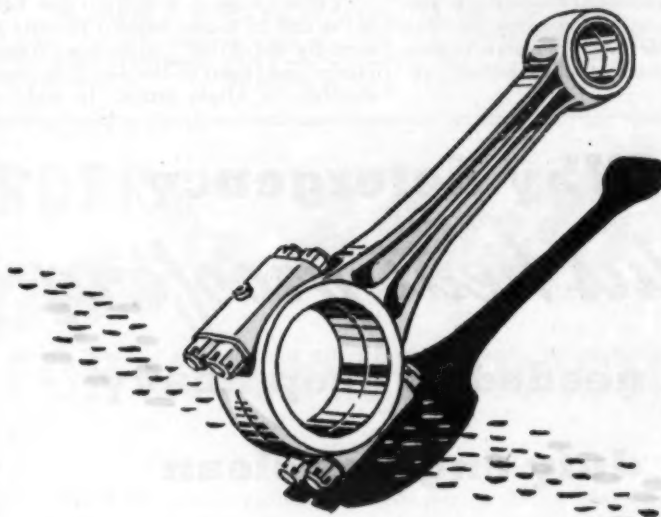
A complete revision to the Test Code Section of the Standards of the Hydraulic Institute, the national trade association of pump manufacturers, has been announced. This section, first published in 1936, contains specific recommenda-

tions for the testing of centrifugal and rotary pumps, both for acceptance tests in the field and in the plant of the pump manufacturer.

The code includes the limiting conditions for all methods of quantitative determination of capacity, head, and power input, whereby the accuracy for an acceptance test can be obtained. Copies may be secured from Hydraulic Institute, 90 West St., New York 6, N. Y., at 50 cents per copy, payable with the order.



You can get a new hat  
in 5 minutes



...but it may take weeks  
to replace a burned-  
out bearing...

The answer is  
Preventive Maintenance  
now with Shell  
Diesel Lubricants



The vital war metals used in bearings are becoming increasingly hard to get. Deliveries on present stocks are questionable. Yet, there are operators who are working their oil "overtime" in order to "save time and oil."

Driving even the best made oil beyond its limit of usefulness can cause sludge, plugged oil lines . . . ruined bearings.

Under today's peak-load conditions oil should be carefully watched, *and in many cases changed more often than usual*, depending on the type of service to which it is subjected.

Yes, changing the oil requires time. But the few minutes it does take may save days of delay later. Don't wait for a bearing failure. Call in the Shell man now. Let him help you plan your Preventive Maintenance.



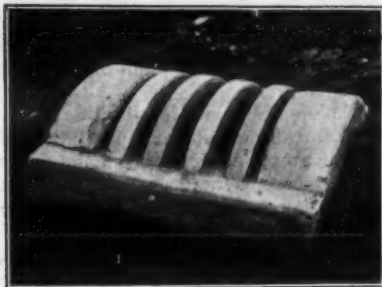
**SHELL DIESEL LUBRICANTS  
AND SHELL "DIESELINE"**

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C. & E. M. Photo  
A precast concrete inlet grating used in Ohio ditches.

### Plain Concrete Ribs For Catch-Basin Top

On new construction in Ohio, further conservation of critical materials is being effected by using plain-concrete ribs for catch-basin tops in place of cast-iron or cast-steel gratings. This saving is possible if the ribs are installed in catch basins in the drainage ditch where they are not subjected to traffic loads and impact.

The standard No. 1-2-A catch basin is built of Class C concrete, or if of brick, the walls are 8 inches thick and plastered  $\frac{1}{2}$  inch thick inside and out with a 1 : 2 cement mortar. The four precast concrete ribs at the top are separated by a brickbat  $2\frac{3}{4}$  inches wide used as a spacer and grouted in. The space between the outside ribs and the top of the catch basin is  $1\frac{3}{8}$  inches, and the ribs are seated  $4\frac{1}{8}$  inches at either end with the basin top rising 4 inches above the seat all around. The ribs are 2 feet 8 inches long, 12 inches high, and 3 inches thick, with the top arched on a  $20\frac{3}{4}$ -inch radius. A 2-inch hole is cast in the center of each rib 4 inches from the top for handling. All edges of the ribs are rounded on a  $\frac{1}{4}$ -inch radius.

### Bulletin on Flight Strips

"Flight Strips—Their Need and Use" is the title of a new bulletin recently issued by the Army Air Forces to summarize and report on the design and construction of Flight Strips. In addition

to a description of Flight Strips, the various types of service rendered by these auxiliaries are discussed and illustrated.

Copies of this bulletin, 3-9076, AF, may be secured by interested contractors and engineers from the Army Air Forces Library, War Department 25, Washington, D. C., upon request.

### Change in Ownership Of Quick-Way Shovel

Announcement has been received from Quick-Way Truck Shovel Co., 4150 Josephine St., Denver, Colo., that on July 15, 1943, the interest of the J. H. Jay Estate in the Quick-Way Truck Shovel Co. was purchased by Luke E. Smith, the surviving partner. The manufacture of this shovel in its various combinations will continue under Mr. Smith's management. He reports that new experience gained in manufacturing quantities of new machines and parts will assure prompt shipment, whether the order is for new machines or parts.

## Why detergency plus heat-proofing is needed to keep heavy duty engines clean

● STANOLUBE H. D. is a "heat-proofed" oil. What that means is described by the diagrams on this page. What it means in longer engine life and lower maintenance is written in the records of millions of miles of heavy duty operation rolled up by trucks and buses, contractors' equipment, and the jeeps, trucks, and tanks of Uncle Sam.

In fact, it is only because of the vital part your civilian fleet plays in the war effort that Stanolube H. D. is made available to you. Take advantage of the opportunity.

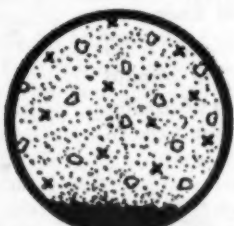
Let Stanolube H. D. help you solve the biggest problem you have today—that of making your equipment last for the duration.

Ask a Standard Oil Man to help you test Stanolube H. D. See for yourself how persistent deposits in heavy duty gasoline and Diesel engines disappear when Stanolube H. D. takes over. Write to any local Standard Oil Company (Indiana) office, or 910 S. Michigan Ave., Chicago 5, Illinois. In Nebraska, write Standard Oil Company of Nebraska at Omaha 2.

### These pictures tell the story

#### Engine deposits caused by oil contamination

Most troublesome engine deposits are caused by the gradual contamination of motor oil in use. The contaminants usually found in conventional oils are shown in the diagram below.



1. Road dust.



2. Fuel soot or carbon that has blown by piston rings.



3. Oil oxidation products caused by excessive engine heat and agitation of oil in the presence of oxygen.

**NOTE:** Water is a contaminant frequently found in motor oil. It results from leakage or condensation, and produces water sludge

which takes many forms—from a slimy mass to deposits easily confused with those caused by dirt or oil failure. Water sludge occurs more frequently in cold-running engines, such as in delivery trucks. It can be eliminated, not by changing the type of oil, but only by correcting the mechanical condition causing it.

Dust and carbon particles form heavy deposits in ring grooves and crankcases, and on valve stems, rocker arms, oil screens, and filters.

Oil oxidation products are of many types. Some cause rapid increase in oil viscosity. Others, under certain conditions, cause corrosion. But by far the most prevalent and troublesome oil oxidation product is that causing a varnish or lacquer-like coating on pistons, cylinders, and valve stems. This type of product is not only troublesome itself, but it acts as a binder for dust and carbon particles.



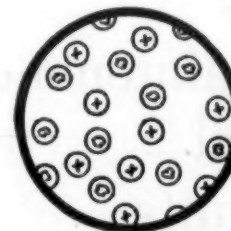
Oil is ammunition . . . Use it wisely

### Effect of detergency on contaminants



Detergency in motor oil eliminates deposits by preventing fine dust and carbon particles from settling out of the oil. In effect, the detergent surrounds the contaminants with a film which prevents them from adhering to each other and to metal parts of the engine. It holds them in suspension until they are removed by the filter or drained from the crankcase. But detergency alone does not protect against oil oxidation, which causes varnish forming products, viscosity increase, and corrosion.

### Detergency plus heat-proofing or oxidation-inhibiting



To eliminate all troublesome deposits—particularly those occurring under extremely heavy duty service in gasoline and Diesel engines—a new type of motor oil was developed by Standard Oil. First, a petroleum stock was selected with great resistance to oxidation. Then, by solvent refining, the unstable hydrocarbons—those easily oxidized—were removed as completely as possible. Finally, the remainder was stabilized by the addition of a special oxidation-inhibitor and detergent developed in Standard Oil laboratories.

This oil—"heat-proofed" STANOLUBE H. D.—slows down the rate of oil oxidation to the minimum. The detergency becomes doubly effective in preventing deposits from other contaminants. The mild solvency or purging action of Stanolube H. D. gradually removes deposits formed prior to its use and has cleaned up many a dirty engine over a period of time.

# HAISS HI-POWER

## FOR BIGGER PAYLOAD DIGGING

Engineered all the way through to do the job. Backed by fifty years of specialized manufacturing skill and experience. The pay-off bucket for better, more efficient 1943 work.

Haiss Hi-Power has the brute strength for heavy digging, and the power in its bite to yank loose an embedded boulder. Weight and closing power combine to dig deep and tear out a heaping bowlful at every grab. Alloy steel parts for abrasion resistance, long bearings for longer wear.

★ Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.

GEORGE HAISS MANUFACTURING CO., Inc.  
Canal Place & East 142nd St., New York 51, N. Y.

### Contractor's Equipment FOR SALE

Two Rex No. 200 double Pumpcretes with Waukesha 6-cylinder gasoline engines. Complete with pugmill mixers. 1200' 8" pipe. Excellent condition.

12 Wagon drills—type FM 2, Serial X71, Wd Drifter, pneumatic tires.

Great Lakes Dredge & Dock Company  
W. J. Keefe, Pur. Dept.  
122 S. Michigan Ave., Chicago, Ill.



STANDARD OIL COMPANY (INDIANA)

STANDARD  
SERVICE

★ FLEET CONSERVATION SERVICE

# Earth Dam Provides Wartime Water Supply

(Continued from page 2)

The foundation area was stripped of all vegetation and loam overburden. While the body of the dam is of random fill, the upstream face will be blanketed by a 10-foot thick impervious fill of clay. The dam site was stripped by a North-west pullshovel loading to three Athey Forged-Trak crawler wagons. A Caterpillar D8 with a LeTourneau bulldozer was used to spread the material on the dump. The material for the clay blanket was hauled from an adjacent borrow pit down a steep grade by the Athey crawler wagons with Caterpillar D8 tractors.

## Culvert Through Dam

A 34-inch concrete pipe is carried through the dam from the lower toe to the gate house in a concrete arch tunnel. A 39-inch concrete pipe extends from the gate house to the upper toe. The tunnel, or culvert, has a 7-foot wide invert with a 3-inch center depression and measures 5 feet 10 inches from the top of the invert to the intrados of the 12-inch thick arch. It is built with 18-inch collars for water stops, 18 inches wide on the outside, at intervals of 50 feet. Early completion of this culvert or tunnel and the installation of the 34-inch water line permitted early storage of water and delivery of most of the 6 mgd required by the Seabees camp at Magruder, Va.

The access road over which the truck-mixers had to run to bring in ready-mixed concrete for pouring the culvert through the dam was in rather poor condition during the late winter and early spring when this work was under way. A fleet of Blaw-Knox Truk-Mixers was used to deliver the concrete to a convenient point adjacent to the culvert where the mixed concrete was delivered to a 1-yard Insley concrete bucket. The bucket was picked up by a Northwest crane and swung over the culvert area for dumping.

The concrete crew consisted of the foreman, two hand finishers with an in-vert screed running on the forms, two hand finishers touching up, and seven muddlers. Two carpenters handled the setting of the forms assisted by such labor as was necessary and available.

## Estimated Quantities

The revised estimate of major quantities on the Waller Dam and Reservoir project and the pump station and pipe line for later construction, are as follows:

DAM AND RESERVOIR	
Clearing reservoir site	600 acres
Excavation and stripping	30,000 cu. yds.
Earth embankment	250,000 cu. yds.
Concrete, spillway	1,000 cu. yds.
Concrete, intake	300 cu. yds.
Concrete, pipe casing	500 cu. yds.
PUMPING STATION	
Excavation and disposal	1,000 cu. yds.
Piling	2,000 ft.
Connecting pipe line, 24-inch	500 ft.
Concrete substructures	300 cu. yds.
CONNECTING PIPE LINE	
Concrete, force main and valves, 24-inch	6,000 ft.

The estimated cost of Waller Dam and Reservoir is \$547,000, which includes \$75,000 for the land. The estimate for the pumping station is \$60,300 and for the 24-inch connecting pipe line \$46,900.

## VULCAN TOOLS

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.

31-43 Liberty Street, Quincy, Mass.

Branch Offices and Warehouses Stock:

74 Murray St. 34 No. Clinton St.

New York, N. Y. Chicago, Ill.

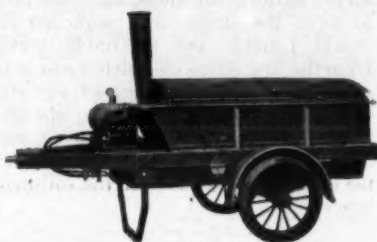
## Personnel

The contract for this work was awarded to Michael Pontarelli & Sons, of Chicago, Ill., for whom C. R. Buckman was Superintendent. The work was done under the direction of Reeves Newsom and E. H. Aldrich of Newsom & Aldrich, Engineer-Consultants for the Federal Works Agency, sponsor and owner of this portion of the Hampton Roads area water-supply project. J. W. Dotterer was Supervising Engineer for the Federal Works Agency and William E. Pettitt was Inspector for the Engineer-Consultants at Waller Dam.

## U.S. Rubber Promotes Lewis

United States Rubber Co., New York City, has announced the appointment of M. P. Lewis as Assistant Manager of the newly created Cable and Wire Division. A native of New York City, Mr. Lewis has been with the company since 1919 when he joined its Bristol, R. I., sales department. Later he became Eastern Division Wire Sales Manager.

## CONNERY'S HEATING KETTLES



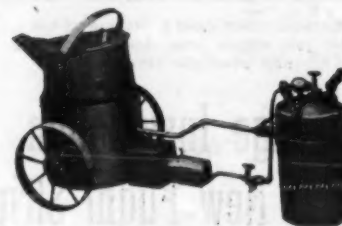
Speed up work by using a Connery Heating Kettle for building and maintaining highways, airports, barracks and roads. Made in sizes of 30, 80, 110 and 165 gallons.

Send today for our complete catalog showing our full line of Tar and Asphalt Heating Kettles, Spraying Attachments, Pouring Pots, etc.

CONNERY CONSTRUCTION CO.

4000 N. Second St.

Philadelphia, Pa.



## HOW TO ORDER



# Repair Parts FOR CRAWLER TRACTORS

● WPB order L-53-b controls the distribution of repair parts for track-laying tractors. According to this order if a part is critical, the prescribed certification, date of your order, and use classification govern deliveries. Preference ratings do not affect shipments or shipping date.

### IF YOU ORDER PARTS BY MAIL

You must sign a certification in substantially the following form:

PURSUANT to the terms of Limitation Order L-53-b of the War Production Board the undersigned certifies to the seller and to the War Production Board that the following statements are correct:

(I).....  
Make and model of track-laying tractor(s) for which repair parts are sought. (II).....

Factory serial number(s).

(III).....  
Owner of track-laying tractor(s).

(IV).....  
Type of work being performed by track-laying tractor(s) described above (describe the job specifically, i. e., mining, logging, agriculture).

(V).....  
Contract number of war agency or P-19 or P-55 serial number and rating, if any.

(VI) The purchaser hereby certifies that he has registered all construction equipment owned by him pursuant to the terms of Limitation Order L-196, unless exempt from the requirements of such order.

(VII) The purchaser hereby certifies that the repair parts listed on the purchase order to which this certificate pertains are the minimum quantity of repair parts immediately necessary to put such track-laying tractor(s) in serviceable condition, and are not for stock.

(VIII) The purchaser hereby certifies that he does not have like parts on hand or on order to repair the above-described track-laying tractor(s).

.....

Date Name of purchaser

Address of purchaser.....

Get this form from your authorized

Cletrac dealer or type and sign on the

order which you mail him.

### IF YOU ORDER PARTS BY TELEGRAM



WHEN parts are ordered by wire, the purchaser must include in the telegram: all information specified in items (I), (II), (III), (IV) and (V) of the written certification used for mail order, and the statement, "Certified under L-53-b." The tractor owner or an official duly authorized to make the certification must sign the wire. The statement, "Certified under L-53-b", shall constitute a certification to the seller and to the War Production Board of the correctness of all information included in the telegram and shall constitute a certification of all facts specified in items (VI), (VII), and (VIII) of the written certificate used for mail orders.

In such case, a copy of the outgoing telegram must be retained by the person placing the order and such copy must be signed by the owner or the authorized official of the company ordering the parts.

### IF YOU ORDER PARTS BY PHONE



IN the case of a purchase order placed by telephone, the purchaser must state to the dealer at the time of placing the order, the substance of the written certification used for mail orders; and the person making the statement must be an official duly authorized to make the certification. He must furnish to the dealer, within 15 days after placing the purchase order, written confirmation of the order, bearing a written certification substantially in the form used for mail orders. In case of failure to receive written certification within the 15-day period, the dealer can not accept any other order from or deliver any additional repair parts to the purchaser until the written certification is furnished.

A Phone Order Must Be Confirmed With Written Certification

● The Cleveland Tractor Co. is operating day and night manufacturing and shipping more repair parts than ever before. We shall continue to exert every effort to meet present day abnormal demands.

There is a Cletrac dealer near you who will be glad to furnish you forms covering the above certifications and who will assist you in every way in keeping your Cletracs in continuous every day service during this war period.

Order All Repair Parts From Your Cletrac Dealer

THE CLEVELAND TRACTOR CO.

CLEVELAND, OHIO

BUILDERS OF CRAWLER TRACTORS FOR INDUSTRY AND AGRICULTURE AND GENUINE CLETRAC REPAIR PARTS

Cletrac Crawler Tractors • Gasoline or Diesel

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C. & E. M. Photo  
The water boy used a bicycle to cover the job which was 8,000 feet long and over 500 feet wide.

## Drainage Installation For New Flight Strip

(Continued from page 33)

terial for the stabilized base for the runway and the stabilized extensions beyond the soil-cement were taken consisted of strata of sand, gravel and loam, the latter being about 30 per cent of the material measured on a face of 4 to 6 feet. Good mixing was secured by filling the shovel bucket from the bottom of the face up and varying the height of the face. The initial material taken from the pit was used to build a work road along the edge of the right-of-way in order to check its stability. It was found that the sand was the limiting factor so that the face was watched carefully to prevent an excess of sand getting into the mix as loaded. A stockpile of several thousand yards of loam was maintained on the field to mix with any sandy places that showed up under the tamping roller.

Drainage of the site is provided by both French and positive drains. The French drains consist of a trench 1½ feet wide at the bottom, widening toward the top so that the inside edge is tight against the edge of the concrete. The trenches vary from 3 to 3½ feet deep and carry 3 inches of gravel below a 6-inch tile, which is of the bell and spigot type with the joints wrapped with burlap. This system is cross-connected by 8-inch tile every 500 feet to the positive drainage system. The French drains are backfilled with screened gravel, the top 12 inches of which is a 1½-inch stone coated in a mechanical mixer with 7.5 gallons of tar per cubic yard. This layer of coated stone is 5 feet wide and acts as a screen or grating to prevent the entry of large material to the French drains, while permitting easy access of run-off of rain or melting snow from the Flight Strip. The coating is of sufficient strength to prevent the gravel being moved by the suction of aircraft propellers.

At all junctions of the side and positive drains, cinder-block manholes were constructed with iron covers. These covers and the small amount of plumbing at the custodian's building comprised the entire use of critical materials on this job, amounting to less than 1 per cent of the total cost. Because of the sandy character of the subgrade the catchbasins also acted as leaching basins, reducing the run-off to the positive drainage system. The trenches for the tile were excavated by a Browning and a P & H crane.

The positive drainage system consists of 12 to 24-inch vitrified tile and is located 250 feet from the center line of the runway. The bell and spigot joints are caulked with jute and cement mortar. These tiles drain to the south end of the area, where natural drainage through an open channel takes care of all surface as well as ground water. Excess dirt from the drainage trenches was removed by one of the Northwest shovels and used for fill in low areas.

### The Concrete Runway

The 150-foot concrete runway was poured in strips 12½ feet wide and 8 inches uniform thickness. Care was taken to pour the strips in a sequence that would provide the maximum service from the first strips completed and at the same time prevent the use of any strip that had not been cured the specified length of time. The strips were numbered from 1 to 12 from the west side to the east and were paved in the following order:

- No. 1 from north to south
- No. 6 from south to north
- No. 12 from south to north
- No. 7 from north to south
- No. 2 from south to north
- No. 11 from north to south
- No. 3 from south to north
- No. 10 from north to south
- No. 4 from south to north
- No. 9 from north to south
- No. 5 from south to north
- No. 8 from north to south

By paving the two outside strips early, it was possible to complete the installation of the 6-inch tile drains outside the paving. When the equipment reached (Continued on next page)

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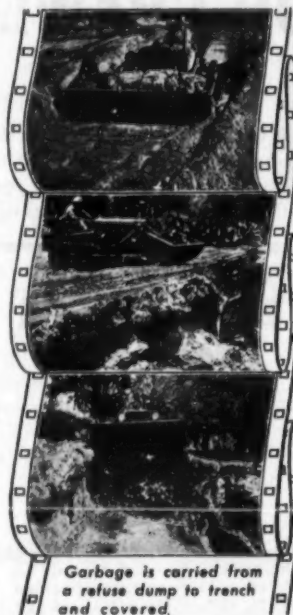
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LEVER SCREW HYDRAULIC  
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Garbage is carried from a refuse dump to trench and covered.



Always on the move with the tough, never-say-quit Marines—working on a variety of war jobs from coast to coast and overseas—now this versatile outfit receives NEW PERFORMANCE RECOGNITION!! Meets requirements to satisfactorily carry out Sanitary Fill method of disposing of refuse. Tried, tested and proved in Army camps...ideal for communities! Excavates trenches, compacts and covers refuse...also grades and maintains site for use as recreational or parking space. Minimizes odor, danger of rats and germs. One of the handiest construction units available. Get all the facts. Wire, write or call.

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## the GARBRO SHIMBLE

The new GARBRO SHIMBLE is a wire rope fitting that is both a SHackle and a thIMBLE. No special connection required—just clip or splice a loop in the end of a rope and slip the rope over the SHIMBLE. This new device has a multitude of uses in the construction and industrial field. The GARBRO SHIMBLE gives better rope protection than any shackle and thimble combination you can buy. Increase your rope efficiency and economize by using GARBRO SHIMBLES on all your cable hook-ups.

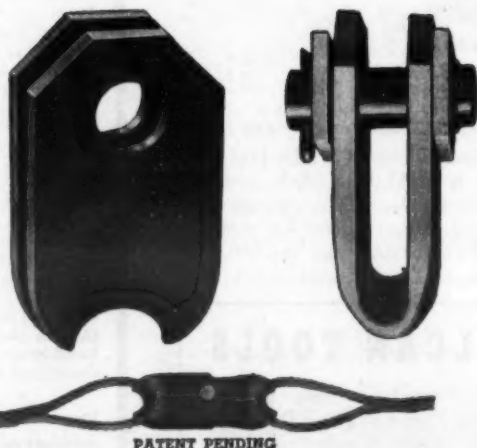
Gar-Bro SHIMBLES are forged from structural steel bars thereby permitting welding to other attachments or bending of side plates to fit special conditions. The photograph at right shows the application of an open SHIMBLE and a CLOSED SHIMBLE to the boom tapping hog-cable on a crane. There are many other applications—too numerous to mention here.

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Garlinghouse Brothers . . . . . Los Angeles, California  
Loggers & Contractors Machinery Co. . . . . Portland, Oregon  
A. H. Cox & Company . . . . . Seattle, Washington

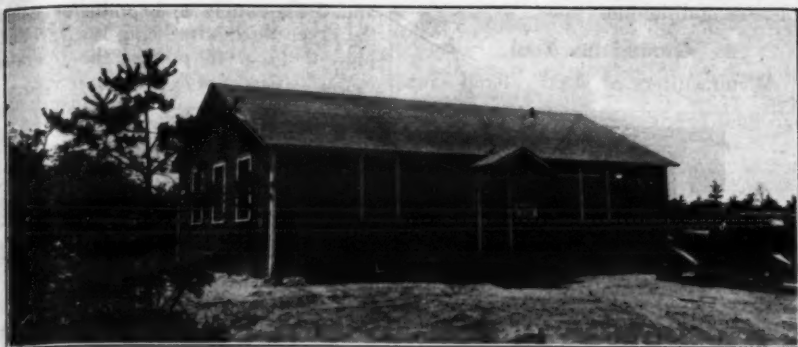
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PATENT PENDING



C. & E. M. Photo  
The engineer's field office, later to be used by the custodian of the Flight Strip.

## Flight Strip

(Continued from preceding page)

the end of a strip, a crane was used to pick up the finishing machines and move them over to the next strip where the steel forms had already been set. By paving No. 6 and No. 7 strips, the center strips, early, it was possible to complete the full 15-day curing period so that the trucks could use these strips for access to the entire runway area.

The 8-inch Blaw-Knox road forms were set on a thoroughly rolled subgrade by two form setters and two laborers ahead of the large fine grade crew. A wood strip was attached to the forms by stove bolts to form the key between adjacent slabs. As soon as the forms were in place, a Caterpillar No. 12 power grader cut out the excess dirt, which was removed by eight hand shovelers. The checking of the forms as to spacing and grade was done with a gage by a crew of five men working ahead of the first six men of the fine grade crew who checked the grade with a scratch template and hand-shoveled out any excess dirt and made up any deficiency. Two additional scratch templates were used back of the first fine grade crew. The completed grade was compacted by a 12-ton 3-wheel Buffalo-Springfield roller, and any low spots built up were again compacted by the same roller and rechecked by two men with another scratch board. Where sand in the subgrade bulked slightly when sprayed, it was leveled out by rolling with 500-pound garden rollers.

Expansion joints of 3/4-inch bituminous-impregnated Celotex were set every 120 feet and matched in adjacent slabs.

## GOOD ROADS



Good roads are a necessity and should be kept in first class repair. A BURCH FORCE FEED SPREADER will do the job better because of its dual feed control, adaptability, ease of handling and a Hydromotor controlled blade, which means control by a touch of a finger.

Manufactured by

**THE BURCH CORPORATION**

Crestline, Ohio

Equipment since 1875

beneath the track and picked up by a Northwest crane with a 45-foot boom and a 1 1/2-yard clamshell bucket assembled by the contractor. Adequate stockpiles of the stone were maintained against the possibility of delays in delivery. None were experienced during the length of the job. Sand was trucked in from a local pit and rehandled by the same crane to the 3-bin Heltzel batching plant where the batches were weighed out as follows:

Sand	1,500 pounds
No. 1 and 2 stone mixed (1/2 and 1-inch)	1,040 pounds
No. 3A stone (1 1/2-inch)	1,273 pounds
Portland cement	6 bags
Natural cement	1 bag

The trucks backed under the batching plant for the aggregate and then drove ahead and under the Butler bulk-cement plant where buzzer signals were used to spot the truck accurately. The batching plant was boarded up because of the frequent high winds. At the bulk-cement plant the contractor installed a Griffin portable generator with a Wisconsin motor to provide current to operate the delivery screw from the cement cars and

for driving the Worthington garage compressor that provided air for fluffing the cement in the hopper. As the trucks  
(Continued on page 60)

## "NORTH-EAST SOUTH-WEST"

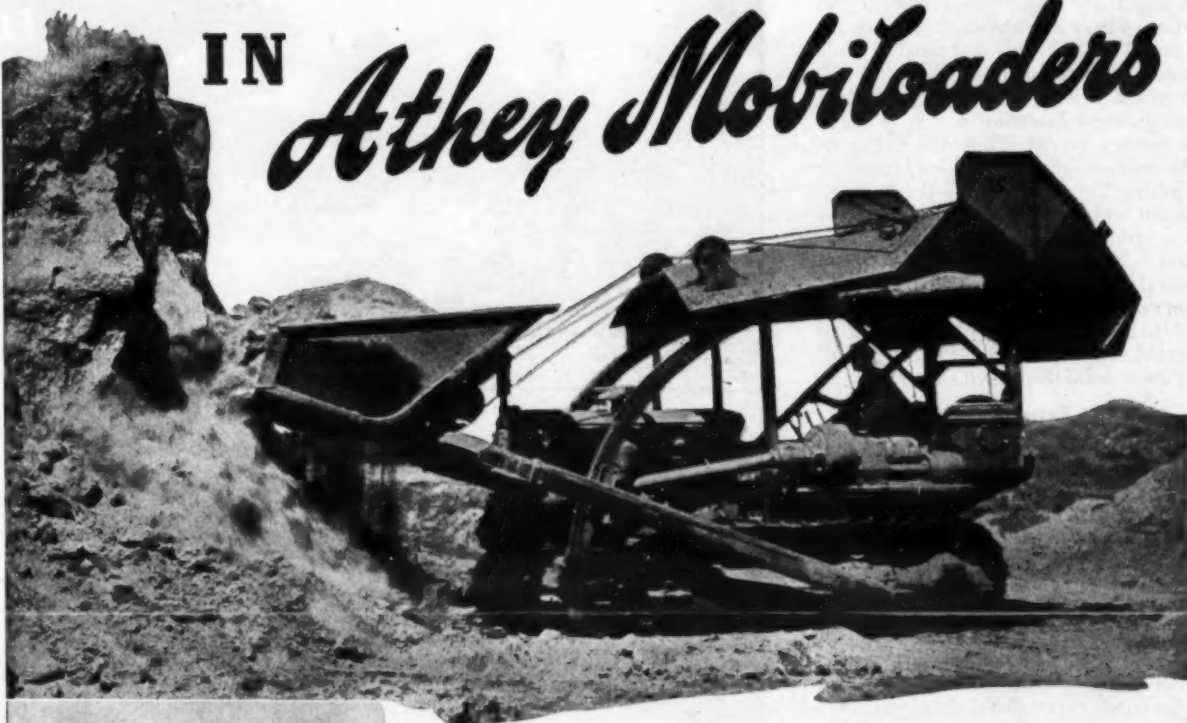
All around the earth are "FLEX-PLANE" contraction joint installers and finishing machines. Roads built by them are "good roads".

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## SPEED AND BIG CAPACITY

## IN Athey Mobiloaders



There's the time-saving combination of speed and big capacity in the Model 8 Athey Mobiloader. It's the tractor loader that meets today's demands for greatly stepped-up wartime production. These speedy workers are widely versatile in their applications . . . they're serving successfully on a range of loading jobs that includes earth excavation, stockpile loading of sand, gravel and coal, iron ore and sugar beets.

Athey Mobiloaders speed up every loading job because there's no time lost in tractor turning. The unit digs its load at the front . . . travels in reverse in a straight-line action to the fill, or truck and dumps the material overhead. Bucket sizes vary from 2.7 to 9 cubic yards, depending upon the material handled.

See your Athey-"Caterpillar" Dealer for full details on Athey Mobiloaders. Ask him about priority ratings and delivery possibilities. Use his complete repair service facilities for all your equipment. Athey Truss Wheel Co., Chicago, Illinois.



Leveling airport runway in middle west.



Loading coral rock from stockpile in Florida.

**ATHEY**  
MOBILOADERS • TRAILERS

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43

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## Rough Usage Shortens Life of Electric Tools

(Continued from page 29)

the brush wears.

Never try to whittle carbon brushes out of pieces of carbon, for ill-fitting brushes can be a major cause of tool failure. Instead, use only correctly designed brushes of the proper size which are made specifically for each type of tool.

### The Switch

The switch is the part of your electric tool which is most vulnerable to damage from abuse and carelessness. However, with reasonable care, it will last as long as other working parts of the tool. Unnecessary snapping of the switch on and off wears it out mechanically; turning off the switch when the tool is under load causes arcing, which burns off the contacts and destroys the switch.

Electric-tool switches should never be oiled or greased. Good switches of a proper design for the application are usually of an enclosed type. From a point of necessity the internal contacts are small and, when assembled at the factory, a very small amount of lubricant is placed on the parts that need it. This internal lubrication is sufficient for the life of the switch. If a switch is oiled or greased, the lubrication is sure to reach the contact points. This will cause an abnormal amount of sparking, resulting in pitting the contacts, and the heat developed will burn the excess amount of oil or grease. The residue left from the burnt oil together with the pitting and general destruction of these parts, will soon result in an open circuit at the contact points. The tool will then fail to operate. It is a good rule to keep the oil can away from the switch.

### The Extension Cord

The cable on your electric hand tool is the "life line" and if it is abused or damaged, the tool will fail to operate, no matter how carefully you care for the rest of the tool. When the tool is not in use, hang it up with the cable coiled loosely with no sharp bends or kinks. Keep the cable clean, wipe it off occasionally, and keep it away from oils and greases that ruin the rubber.

Never pull or carry any electric tool by the cable. Strain-relief clamps are provided to compensate for normal pull, but excessive drag is transmitted to the switch if you carry the tool by the cable. This loosens the lead connections with a possibility of burning out the switch through shorting across the connections.

If extra-length extension cord is used, be sure that it is of sufficiently heavy gage to supply the required amperage to your tool without appreciable loss in voltage. Use of too light an extension cord may result in motor burn-out.

One of the worst abuses of an electric

tool, particularly a drill, is to drag it around by the cable. This not only kinks the cable and strains the electrical connections but it will bend and probably break the drill bit, scar the drill, and cause unnecessary damage.

### Protect Tools from Water

Electric tools may be used in or out of doors, but they must be protected from getting water-soaked, both for their own good and to safeguard the operator from shock. If a tool does get soaked, the best way to dry it is:

1. Remove the stator (or field) and armature;
2. Clean them with a brush dipped in benzine (do not dip the stator and armature in benzine);
3. Blow out with compressed air if it is available;
4. Bake them for a few hours in a temperature not exceeding 250 degrees;
5. And finally, give both a coat of armature finishing varnish;
6. Or better still, send the tool to the manufacturer's service branch for complete reconditioning.

plete reconditioning.

### Ground the Tool

Manufacturers of electric hand saws

and drills supply a 3-conductor cable, the green third wire being for "grounding" the tool to protect the operator  
(Continued on next page)

# TORO

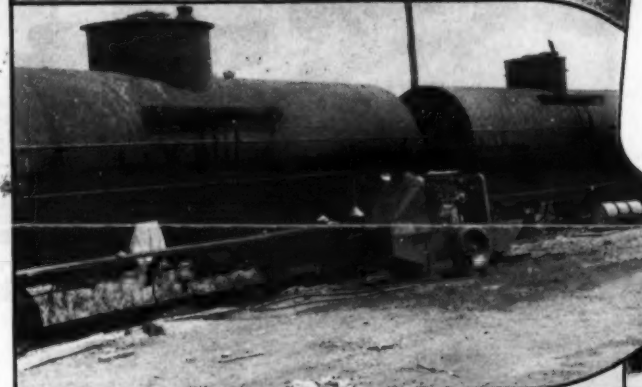
## Power Mowers



### TORO MANUFACTURING CORP'N.

MINNEAPOLIS, MINN.

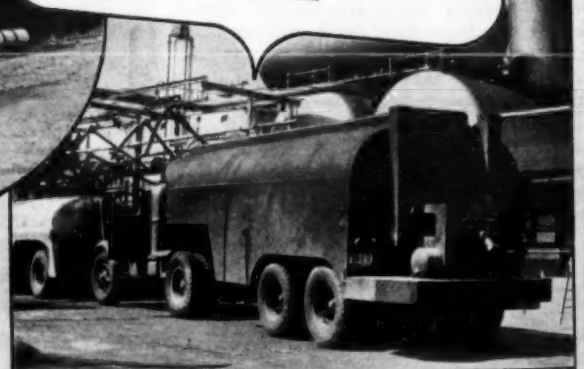
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Let's not forget the present—still let's plan for the future, too! Our vital transportation system calls for the construction of new Highways, Roads, Streets, and the repair of our present system, so be prepared—plan to purchase your Littleford Black Top Construction and Maintenance Equipment after Victory. Pave the Road to Victory first, pave the Roads later.

Upper Left—Road Broom  
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## Proper Operation Will Extend Working Life

(Continued from preceding page)

against shock. This ground wire at one end is attached to the frame inside the housing. The other end extends out the side of the attachment plug. This wire should be connected to a permanent ground, such as a water pipe system, or to any convenient pipe driven into the ground. Grounding is especially important under damp conditions or where abrasive dust is apt to cause a ground in the tool. Its use is a good safety measure.

### Electric Hand Saws

These few remarks on the care and operation of electric hand saws should be noted carefully so that you may secure the best results with these tools. The saw teeth must be sharp, of proper shape, and of equal length. The gullets must be deep enough and of proper shape to clear chips. The teeth must be set just to clear the blade in the work, and the saw blade must not be eccentric. It is recommended that, if possible, you let an expert take care of your blades or send them back to the factory for sharpening and retensioning. Always keep several blades on hand.

Feed the saw to the material evenly so that each tooth will do an equal share of cutting, because an unsteady feed causes scraping and an unsatisfactory cut. The work must be properly supported to avoid binding of the saw blade. A dull blade also overloads the motor and mechanical parts, increases current consumption, slows up the work, and makes a tearing cut. Do not adjust a saw for a deeper cut than is actually being made. For example, if 1-inch boards are being cut, the saw should not be adjusted for a 2, 2½-inch or greater cut, as this consumes more power and causes greater wear. When cutting green or wet wood, use a blade with a wide set so that it will cut clearance for the blade and prevent binding. The instruction books of most of the manufacturers give details on how to sharpen circular saw blades if you are planning to do the work yourself. Follow the instructions very carefully, and you will secure satisfactory results.

Lubrication is extremely important, and the recommendations of the manufacturer as to the selection and use of lubricating oil should be followed in every respect.

Always disconnect the saw before changing blades or brushes and before doing any cleaning or repair work on it. Don't forget to ground the saw before starting work, and be sure to connect it to a good ground when working under wet conditions or in any precarious position. Never remove or lock open the swinging or telescoping saw guard when working.

### Electric Drills

Electric hand drills are most frequently used with twist drill bits for drilling holes in metal. The electric drill supplies the power for turning the twist drill, but the operator must exert a for-

ward pressure to feed the bit into the work. In general, high speed and light feed are recommended. When used in 3-jaw chucks, twist drills should have straight shanks, preferably of the same diameter as the body of the bit. When used in taper sockets, the corresponding taper shank should be used.

Never grind down the shank of a twist drill that is larger in capacity than recommended for use in an electric tool. Naturally, this overloads the tool beyond its capacity and is very harmful to the motor, bearings, gears, and other parts. The shank of the twist drill should be inserted completely into the chuck, and

not half way so that it is supported only by the lips of the chuck jaws. This practice places great strain on the end of the chuck jaws since they do not have full holding surface.

The twist drill most commonly used for general-purpose work has the cutting

(Continued on page 52)

*Serving*  
**the "FACTORY"**  
*in Moving*

**FRONT<sup>too!</sup>**

**ROGERS**

LOW BED -  
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**TRAILERS**

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Koehring Cranes can handle and lay pipe efficiently and safely... because of the Koehring accurate boom control. War construction projects require speed and safety. Hoisting the load, raising the boom while swinging saves seconds with every operation. Every move is a second-saver in handling material... waste motion is reduced to a minimum. All these time-saving advantages of Koehring mean greater speed on the job... for greater production per hour.

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COMMERCIAL HEAT TREATING  
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ALL KINDS OF GRINDING  
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## Proved Economies Of Roadside Care

**Connecticut Report Shows  
That Roadside Work for  
Erosion Control Has Cut  
Maintenance Costs**

ROADSIDE development has proved to be an economic factor of great importance in the highway program, according to the Biennial Report of the State Highway Commissioner of Connecticut for the years 1940-1942. In discussing highway maintenance in Connecticut and the work of the Roadside Development Division, this report states that, aside from the less tangible values of safety and efficiency, roadside development has solid worth in the form of reduced maintenance costs on the roadways. The accompanying graph illustrates this important result of extensive but simplified erosion-control measures.

This type of work has been performed in Connecticut for several years and at the present time, as can be seen from the graph, smaller roadway maintenance crews are required for removal of eroded material from gutters. The reverse of this would be true if no erosion control had been undertaken. Without such control, large amounts of soil would wash to the gutters and the traveled way of the roads wherever there were raw cuts, and roadways would be endangered wherever raw fill existed. In either case, extensive labor and material would be needed to repair the damage of severe rains and spring thaws. In the current labor market, with the scarcity of man-power, this would be a problem of vastly greater proportions than just dollars and cents. The preliminary erosion-control features installed at a moderate cost make possible these savings in men and money as well as savings in wear on vitally needed and irreplaceable equipment.

### Recent Roadside Work

The personnel of the Bureau of Roadside Development in Connecticut is now considerably reduced from that of recent years, due in part to war conditions and in part to the substantial completion of repairs necessitated by the 1938 hurricane. These consisted of removal of trees and stumps of trees blown over by the storm, their replacement with thou-

sands of young trees, and the strengthening and rehabilitation of trees injured but not completely destroyed.

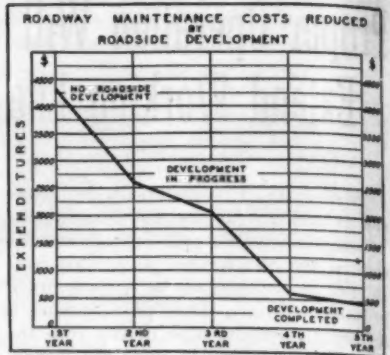
This reduction has also been due to the much simpler and less expensive landscaping on the Milford and Wilbur Cross Parkways and on the Hartford bypass, in comparison with that established on the Merritt Parkway which, until the growth was well established, required a large amount of labor. Since Pearl Harbor, a deliberate omission and deferment of some types of roadside work which can be postponed has resulted in a further reduction.

### Roadside Expenditures

Less than 2 per cent of the Connecticut State Highway Department's expenditures, or about 25 cents per capita of the state's population, goes for the maintenance of Connecticut roadsides. The bulk of this expenditure is for highway safety, the largest individual maintenance expenditure of the Bureau of Roadside Development being for the care of trees along the highways. The state

owns several hundred thousand shade trees along its highways, which while providing an attractive part of the Connecticut scene also require care, such as the removal of dead branches overreaching the highways to prevent injuries to the traveling public. The cutting back of tree growth on the inside of curves and at intersections to clear sight lines, the cutting of tall grasses and brush to prevent the obscuring of warning signs, and the "scaling" of rock cuts to prevent fragments of stone from falling into the roadway are other important activities.

There was an era when Connecticut spent substantial sums on the "beautifying" of its roadsides through plantings and the creation of roadside parks. That era, however, has passed. The present objective in Connecticut is to restore the roadsides, as quickly as possible, to an appearance natural to Connecticut, stabilizing them with an attractive growth both for the sake of beauty and of economy, to prevent erosion of the slopes, and costly piecemeal removal of the



The cost of clearing eroded material from the roadway surface on 80 miles of representative road in Connecticut prior to erosion control was about \$4,300, as shown above. After five years of this work, the cost leveled off to about \$450, an important annual saving.

eroded material from the gutters. William J. Cox is State Highway Commissioner, and John L. Wright is Director of Roadside Development, in Connecticut.

**TODAY  
AS ALWAYS**

**FOR EFFICIENT DIGGING**



**MOVE MATERIAL  
THE SHORTEST  
DISTANCE IN THE  
SHORTEST TIME**

Are you sure you are getting the most out of your excavating equipment? That your job setup takes full advantage of the primary factors of Distance and Time to secure efficiency and long life?

Under pressure of continuous 3-shift wartime operation, on-the-job compromises may bring about alterations in your planned setup which result in lowered production. To overcome this, owners and operators will find it advantageous to make occasional checkups of their machines and methods.

As a guide to such a fresh and critical approach, we have prepared a booklet filled with down-to-earth suggestions. Ideas for the operator, tips on maintenance and the importance of adjustments, brass-tack discussion on lubrication, power plant servicing, hints on efficient handling of shovel, crane and dragline and on the importance of observing safety rules—all are presented in simple, readable form which we believe every owner and operator will find useful. A copy is yours for the asking from your Bucyrus-Erie distributor; or if you prefer, write us direct.



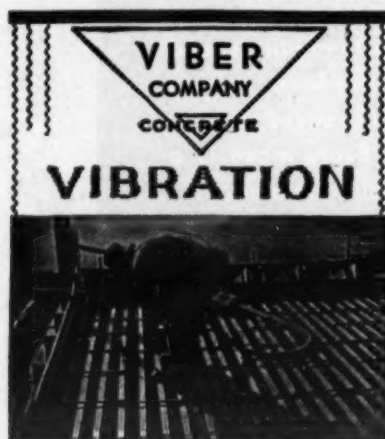
This 32 page, 5 1/2 x 8 1/2" booklet, attractively illustrated and printed in two colors, is packed with practical, experience-tested suggestions on how to maintain maximum excavator production. The material applies to any make of excavator, any size. Extra copies available for your operators and foremen.

**KEEP EVERY EXCAVATOR PRODUCING AT MAXIMUM EFFICIENCY**



**Bucyrus-Erie**

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When the job calls for mass vibration—the Viber Vibrator at work above is your best bet. Especially made for walls over 10 inches thick, foundations, large girders thick floor slabs, columns . . . large reinforced concrete bridges, grade separations, concrete floor systems, concrete arches and rigid frame structures . . . in a word, for all concrete with large aggregate and low water-cement ratio.

Write for complete VIBER data TODAY!

**VIBER COMPANY**

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BURBANK, CALIF.

### Obsolete Bridges Are Problem to Counties

Antiquated bridges in Harvey County, Kansas, are the bane of the county budget. County Engineer Charles Craig stated in a recent issue of *The Treating Record*, published by the American Lumber & Treating Co. The cost of maintaining obsolete bridges in Harvey County is \$2 per linear foot each year, and 433 of these bridges amount to a total of 15,139 feet. The cost of replacing weak narrow impermanent bridges would cost from \$500,000 up to \$1,500,000, depending

on whether treated wood or concrete was used.

This year, Mr. Craig reports, Harvey County will have only \$18,000 left for new construction after obsolete-bridge maintenance is paid. Every new bridge built provides a maintenance saving which can be applied to more new construction in the future.

Craig stated that the 1,100 miles of public roads in Harvey County, including the county road system, are designed to provide an all-weather road at a distance of not more than 2 miles from every farm in the county.

### Effect of Construction On the National Economy

A reprint of an address by Charles M. Upham, Engineer-Director, American Road Builders' Association, on "The Effect of Construction on Our National Economy", presented at the Twenty-Seventh Annual Meeting of The Conference Board in New York City on May 26, 1943, has been made available by the Association as part of its program to stimulate post-war construction. Copies of this 20-page pamphlet may be secured direct from the American Road

Builders' Association, International Building, Washington 4, D. C., by mentioning this item.

The address discusses the major factors in our business economy, influences which affect economic cycles, employment and unemployment, the national income, idle money, taxes, the national debt, and the effect of construction, both public and private, on the economic stability of this country.

*The machines you now have must last for the duration. Proper care and lubrication will keep them working.*

# PLAN AHEAD

## FOR "CATERPILLAR" DEALER SERVICE



**T**HESE WAR DAYS, every working hour counts. All of us are having to plan our time, just as we plan the use of our ration coupons. You figure ahead, so that you won't be caught without gasoline — or butter — or shoes. And it's even more important to anticipate the needs of your "Caterpillar" Diesel equipment.

If you were to call your "Caterpillar" dealer tonight and tell him you wanted a machine overhauled tomorrow, he might be too busy to do it. He's got a big job on his hands, keeping all the heavy equipment in his territory in good running order. On the other hand, it's vital to you that your machines lose as few working hours as possible.

A little forethought now may save you a lot of time and expense. Take a look at your calendar. Figure when you will best be able to spare your "Caterpillar" Diesel. Then get in touch with your "Caterpillar" dealer and arrange a date beforehand. A quick inspection will enable him to tell whether a complete overhaul is needed—whether any parts must be replaced — or whether minor adjustments will answer the purpose.

If parts are necessary and orders are placed well in advance, he'll be ready to give you prompt service on the day set.

Sturdy stamina is built into every "Caterpillar" Diesel. But even such a machine needs service when it's worked overtime month after month. If you make no advance provision for that service — if you put it off until the eleventh hour — it may cost you time and money.

Being forehanded in such matters helps to spread the available materials and man-hours fairly among all owners. It's one way to win the war.

Your "Caterpillar" dealer will do his best for your equipment if you help him by planning ahead. And his "best" is mighty good. Modern shop practices and precision tools enable him to make service adjustments and repairs with the least expenditure of money and war-needed metals.

If you need a new "Caterpillar" Diesel for war-essential work, he will gladly advise you on how to apply for it. And if you can't obtain a new machine, he will do his utmost to keep your old equipment running.

## CATERPILLAR DIESEL

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

**TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!**

V4019

SEP

43

XUM

## Latin America Looks To Post-War Program

(Continued from page 21)

of Public Health of the countries which have benefited by the OIAA (the Institute of Inter-American Affairs in South America) are enthusiastic and anxious to use the "sample" sanitation measures as springboards for larger post-war projects when materials are more readily transported by sea between the Americas.

The work already completed on the Pan-American Highway in Central and South America has opened up rich and up-to-now undeveloped territories which these countries are desirous of settling and utilizing in the future, and even more areas will be within easy reach when the Highway is completed. This will necessitate construction of all types, roads, bridges, airports, houses, public buildings, sanitation, etc., to make possible the planned development of these practically virgin territories. The Highway has also made possible more trade between countries, which will stimulate still further construction and development and a demand for the goods and services making for a higher standard of living.

Another effect of the completed Highway and of the expanded air-transportation system will be the stimulus to tourist travel after the war. North Americans, ever with the urge to "go places", will have accumulated a large reserve in savings and war bonds, some of which will inevitably be spent on the travel which has been denied us during the war years. As soon as possible after the war, North Americans are going to get into their cars, or aboard their ships and planes, and make up for lost time. The increase in knowledge of and interest in this hemisphere, plus the destruction in Europe, will turn many travelers toward Central and South America and the West Indies. This will mean the construction of more modern sanitary tourist hotels, auto camps, and highways leading to interesting sections of these countries which the tourists want to visit.

Most of the Latin American countries are looking forward to construction programs as soon as possible, and public works will constitute an important phase of this program. Venezuela has announced plans for an extensive public-works program, to be financed with the aid of a \$20,000,000 credit from the American Export-Import Bank, which is expected to replace a loss in oil exports resulting from wartime tanker shortages. Roads, hospitals, sewerage systems, port facilities, and similar items are among the projects planned. Since this work cannot be carried on now due to lack of materials, it must be postponed until the post-war period.

### U. S. Money vs Self-Sufficiency

While we have in the past and are still lending money to Latin American countries, those republics from which we are purchasing large quantities of war materials are building up very large trade balances in this country, awaiting the time when they can use them to buy the

goods not available now. While Latin America, as elsewhere, is developing some industries of her own, it is expected that her purchases of industrial, construction, and farm machinery will continue, although the purchase of consumers' goods may drop because she is producing her own.

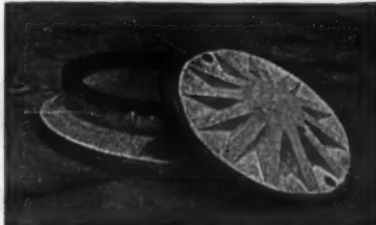
Latin America is being viewed in some quarters as an excellent field for private investment in the post-war years. However, the success of this kind of financing will depend upon the foreign policy of this country and upon the manner in which these investments are made. There is a strong feeling throughout South

America against allowing foreign capital to control their natural resources, and such investments would probably have to be made cooperatively with the countries themselves, with the investors content to accept a reasonable return on the investment. No longer can foreign-

(Concluded on next page)

### The War Production Board Says . . . "NO MORE MANHOLE COVERS of Cast Iron"

But six months before this order was issued the Cast Stone Institute and United Concrete Form Products had developed a reinforced concrete manhole frame and cover which were in commercial production throughout the country.



Only this concrete manhole cover offers these advantages:

- Light in weight (cover weighs only 90 lbs.)
- Carries H-20 Highway loading (16,000 lbs. plus 25% for impact).
- Exposed edges "Armored" to prevent chipping due to either rough handling or wear.
- Saves vital steel for its important war job: meets requirements of the WPB.

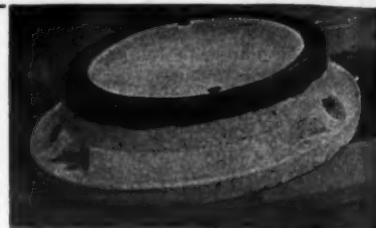
Write for the address of the distributor in your locality . . .

**UNITED**

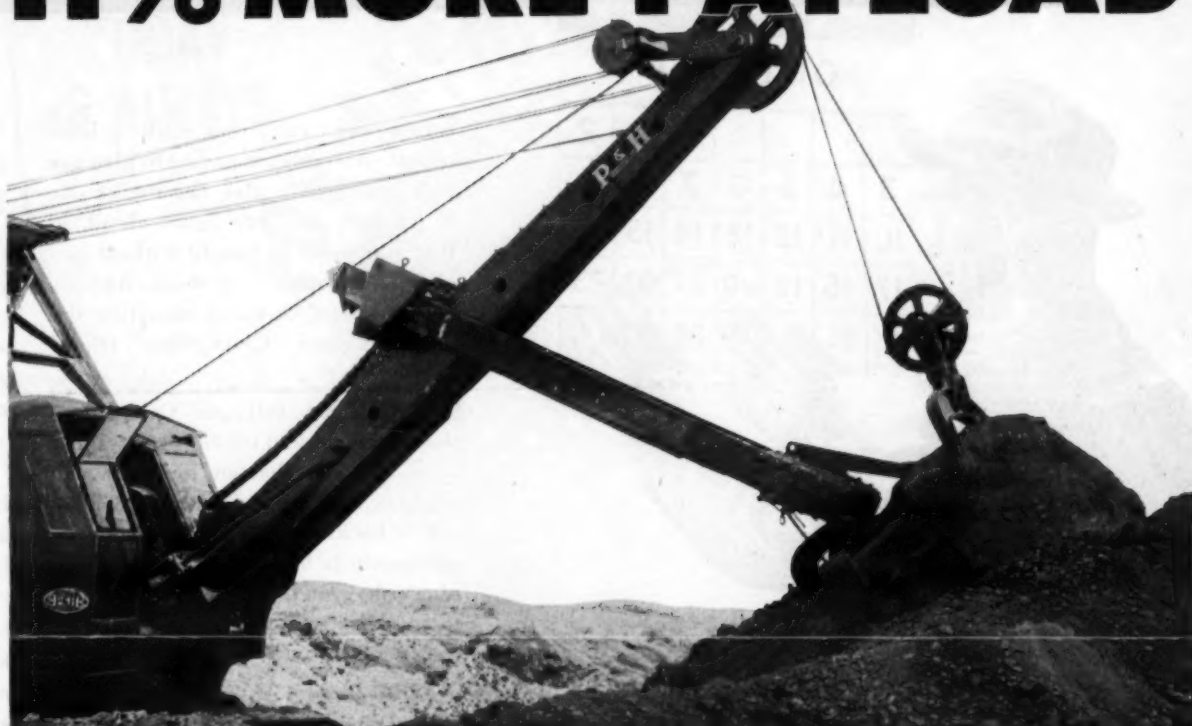
**CONCRETE FORM PRODUCTS CO.**

5243 W. 25th Place  
Chicago, Ill.

101 Park Ave.  
New York City



## 11% MORE PAYLOAD



# WELDED DIPPERS

**ON HARNISCHFEGGER-P & H SHOVELS**  
gives the added capacity that speeds construction  
on huge dam war project in southwest

#### QUICK FACTS ON SHOVEL CAPACITY

	Empty Dipper Weight	Loaded Dipper Weight	Net Payload	Added Capacity of Shovel	Added Capacity Percentage
2 1/2 yd. PMCO Welded Dipper	5125 lbs.	11,875 lbs.	6,750 lbs.	675 lbs.	11%
2 1/4 yd. Solid Cast Dipper	6000 lbs.	12,075 lbs.	6,075 lbs.		



CONSULT YOUR  
SHOVEL MAN

We operate the largest and most complete manganese steel foundry in the United States.

**PETTIBONE MULLIKEN CORPORATION**

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4710 West Division Street, Chicago 51, Illinois

**SAVE 50% ON FUEL AND WAITING TIME**  
when Heating and Melting  
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**USE AEROIL THE FAMOUS HEET-MASTER**

80, 115 and 165 gallon sizes on skids and on steel wheels. Send for FREE Bulletin No. 194PC (specifications, prices, etc.)

**AEROIL BURNER CO., INC.**  
5775 Park Avenue, West New York, N. J.  
Chicago San Francisco Dallas

# U.S. Can Cooperate In Rebuilding World

(Continued from preceding page)

ers take all the profits.

## Opportunities for Engineers

U. S. engineers were invited to administer construction projects and other technical enterprises in the Latin American countries until their own nationals completed their technical training, many of them in the United States. Then, to make a place for their own engineers, and at the time of a very poor international policy on the part of the United States, and due in part to the attitude of superiority and aggression on the part of many Americans, those countries ruled out U. S. engineers but continued to use more American equipment than that made by German and English firms. The Latin Americans, like most of the rest of the world, respect United States technical achievements, and they are glad to work with our engineers and benefit from their knowledge and training. Now, because of the present emergency, many American engineers are once more working in these republics, and when doing so in a spirit of friendliness, cooperation, and equality, they are welcomed.

Oscar Correia, Consul General of Brazil in New York City, wrote to us: "It is to be expected that ample freedom of trade and renewed opportunities will be afforded to all nations in the post-war period of reconstruction. Therefore, I see no reason why American contractors should not bid on work in Brazil, where the demand for American equipment has always been very brisk."

## Conclusion

To sum up, there will be a vast amount of construction to be done in the post-war period—houses, highways, bridges, grade separations, airports, and industrial plants—and certainly American construction equipment and to some extent American construction men will have a share in the rebuilding of a new and, we hope, better world.

But the share which we shall have in that reconstruction, and the extent to which we contribute to that better and more peaceful world, will depend upon the policy of this government, whether

we shall take our place in the family of nations, content to work with them and accept a share of the benefits, or whether we embark upon a policy of economic imperialism designed to corner the markets of the world for ourselves, which will lead only to another world conflict and by which we shall break faith completely with the American men who have died and will die to win this war.

## Effect of Holes and Ruts In Highways on Tire Life

An 8-page pamphlet entitled "Effects of Holes and Ruts in Highway Pavements on Tire Life" has been compiled by the SAE War Engineering Board for the Automotive Council for War Production at the suggestion of William Jeffers, Rubber Administrator of the War Production Board. This study points out in text and pictures what happens to a tire when it strikes a deep hole in a pavement and how ruts and holes can drastically shorten the life of tires and other parts and, in extreme cases, result in

immediate failure. Defective road shoulders are also hard on tires.

It is also pointed out that the adverse effect of pavement defects on tire life are augmented by under-inflation and overloading. Many operators tend to reduce tire pressures for travel over rough roads, but this should not be done as under-inflated tires are more susceptible to bruising and severe flexing which increases internal heating.

Copies of this booklet may be secured by interested contractors and state and county highway engineers direct from the Automotive Council for War Production, New Center Bldg., Detroit 2, Mich.

## Traffic Drop Reported

For every 100 motor vehicles counted on the roads in the East in June, 1941, there were only 40 in June, 1943, according to a recent announcement by the Public Roads Administration. For the Middle West and West, in the same months, the drop was from 100 to 57.

Let this new **HOBART DATA SERVICE** *BE YOUR GUIDE!*

WELDING SUPPLIES  
STRUCTURAL STEEL FOR BUILDINGS

Valuable Information that will save you time, money and material **FREE!**

To help you, we have compiled this special service. It helps you locate metals that will solve your construction or maintenance problems. Ask for your copy on your letterhead.  
Hobart Bros., Box CE-93  
Troy, Ohio

**HOBART Simplified ARC WELDERS**  
One of the World's Largest Builders of Arc Welders



from FLYING

## American Roads in Europe

THIS Martin B-26 is landing on an American road "somewhere" in Europe. These American roads are laid side by side in Europe. They are wide, long runways that get our heavily laden bombers off safely and welcome them back smoothly.

These runways are built by American road machines, too, in the driving hands of the U. S. Engineer Corps. They include Barber-Greene asphalt mixers, dryers and bucket loaders—Barber-Greene Asphalt Finishers that lay a ten or twelve foot compacted mat. These B-G Finishers provide quick construction and immediate use of these vitally needed airfields.

This is the equipment that will build and repair our postwar roads and streets faster and at less cost per mile or block.



Awarded August, 1942

Now is the time to investigate the Barber-Greene line of equipment—some Barber-Greene are available today for high rated projects. Get the facts NOW for the postwar period that these machines are bringing ever closer. Write to Bituminous Equipment Sales, Barber-Greene Company, Aurora, Illinois, U. S. A.

Below is the Barber-Greene Asphalt Finisher that thoroughly compacts material in place and automatically levels out uneven surfaces. This is one of the units in the Barber-Greene Army Asphalt Plant.



43-3

**BARBER - GREENE**  
Buy a Barber-Greene later by buying War Bonds now

## MARVEL-KOTE MEMBRANE CURING COMPOUND FOR ALL CONCRETE SURFACES

Meets Federal and State Specifications

ALSO

ASPHALT ROOF COATINGS  
ROOF AND METAL PAINTS  
CAULKING COMPOUND  
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RUST PREVENTIVE  
OTHER WATER-PROOFING  
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CONCRETE CHEMICAL CO.  
310 Railway Exchange Bldg.  
Kansas City, Mo.

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## Pay More Attention To SAFETY on Jobs

(Continued from page 25)

to look into a gasoline tank, and removing the caps from boiling radiators.

Accidents due to leaving equipment in gear, not setting brakes, and otherwise failing to secure machines and their parts before making repairs, moves, and doing other work were relatively infrequent but were severe.

Injuries due to poor housekeeping occurred on machines and on the ground. Mud, oil, loose boards, and tools caused slips and falls on machines. On the ground and roadways, loose ties, boards, fogs and wire were tripping hazards.

Accidents due to overloading equipment were infrequent, but like other infrequent causes, resulted in serious injuries, delays and property damage. The worst accidents happened from overloading draglines and cranes; the booms collapsed and struck workers. Reports state that power shovels were overloaded in at least two ways: the first was filling the dippers too full, causing rocks to fall and strike workers in swinging the dipper; the second was taking too large a bite and at the same time using too much power so that the machines pitched and threw the operators and oilers against parts of the machines.

### Summary

It is obvious that far greater attention must be given to the elimination of the causes of accidents resulting in fatalities or serious injuries, heavy property damage, and long lay-ups of equipment. While marked improvement was effected in the 1942 injury frequency rate, this was accompanied by a much smaller decrease in the severity rate as compared with 1941. There was little improvement in the frequency and severity of serious accidents.

### Remember This—For Safety

The principal source of serious accidents involves the operation of draglines, tractors and other general construction equipment. Motor timing must be more carefully checked and brakes, cables and clutches must be more frequently and thoroughly inspected and kept in first-class condition. Supervisors must devote more time to directing equipment operations, be more positive and effective in the instructions they give to workers in safe practices, and the enforcement of such practices must be more strict.

Special attention should be given to:

1. Controlling the movements of tractors, cranes and other mobile equipment by warnings and signals.
2. Keeping clear of moving equipment and loads.
3. Unauthorized riding on railroad and other equipment.
4. Safe practices in cranking motors.
5. Stopping cables, gears, and motors before oiling, repairing and otherwise working on them.
6. Guarding gears and other dangerous parts of machinery and protecting against falls into ditches, man-holes, and other openings by barricades and rails.
7. Safe practices in handling materials by hand.
8. The use of personal protective equipment, especially safety shoes and goggles.
9. Blocking equipment properly on grades, and blocking heavy parts in repairing or changing them.
10. Methods of operating equipment over rough ground.
11. Training workers in the safe way to hook, couple, and hitch without injuring the hands.
12. Safety requirements in operating close to power lines, edges of fills, and similar dangerous locations.
13. Safe practices in fueling and servicing equipment.
14. Procedures in securing equipment, brakes, booms, and other movable parts before repairing, leaving, or moving.
15. Housekeeping on equipment, grounds and roadways.
16. Handling loads of proper weight with power equipment.

### New Roads in Bolivia

Bolivia, an important source of tin and other strategic minerals, is moving to improve her transportation system in order to develop her mining and agricultural resources. With her mines located on a high plateau, Bolivia needs better highway communications to the food-producing areas east of the plateau. With credits from the United States, Bolivia has set up the Bolivian Development Corp., and U. S. highway engineers are being assigned to assist in the road work under an agreement with the U. S. Public Roads Administration.

Bolivia has plans for two important

roads, each about 300 miles long, to connect Cochabamba and Santa Cruz and Sucre and Camiri. Extension of highways is considered more practical than railroad construction in view of the difficulty of obtaining railway equipment, while highways can be built with local materials and labor.

With the opening of the road to Santa Cruz, timber, hides, rice, sugar and figs may be transported to the Altiplano, while the highway between Sucre and Camiri would make available oil from the Camiri area.

Last year Edward Willis and Harry A. Hart, PRA engineers, were members

of a U. S. economic mission to Bolivia and collaborated with Jose Gonzales, engineer of the Bolivia Highway Commission, traveling hundreds of miles through the Andes and the forested country at the headwaters to the Amazon, to determine the effect of new highways on Bolivia's economy.



## MARTIN TRAILER

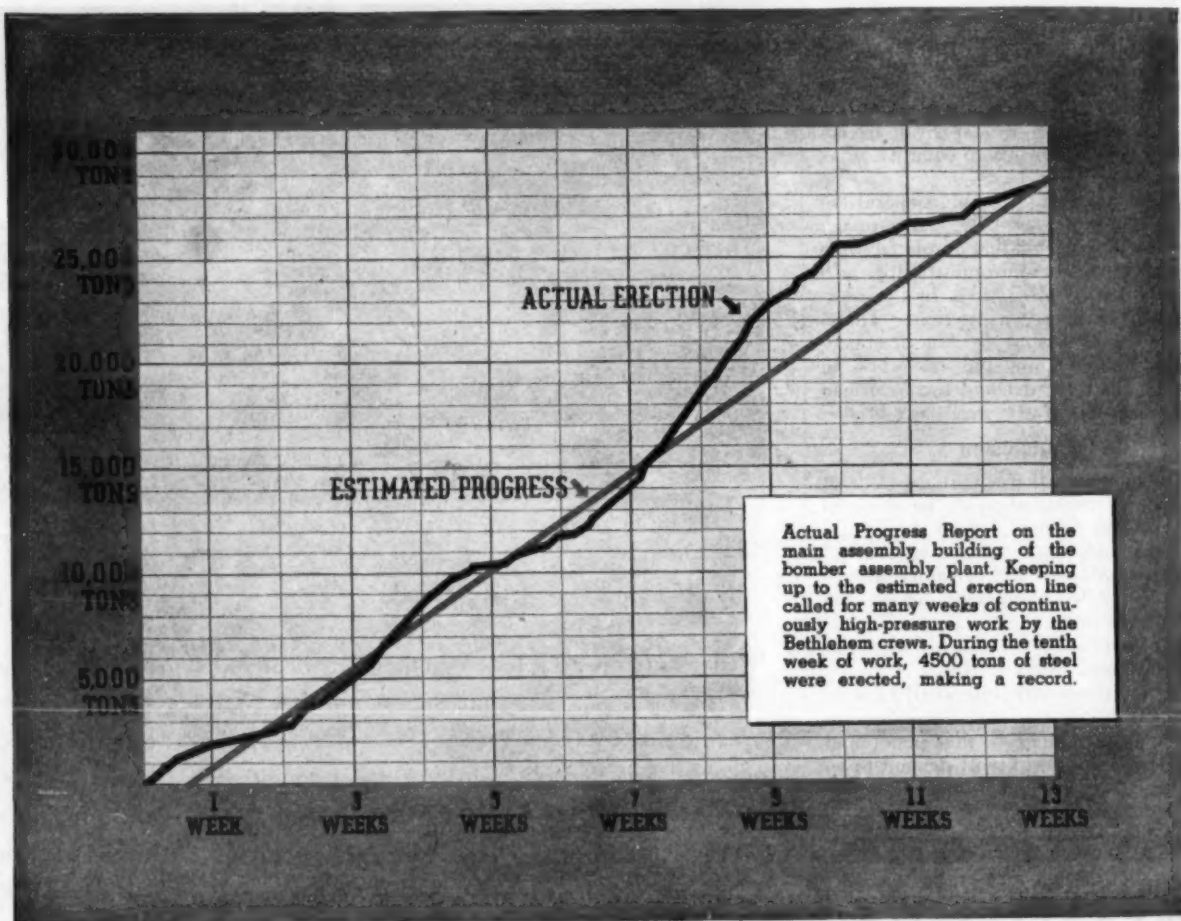
— 4 models —  
7, 10, 15 & 20-ton  
capacities

Don't say, "We want a TRAILER." Say: "We want a MARTIN Trailer."—This will insure your getting a trailer that's EASY LOADING, POWERFUL, FAST, SAFE, LONG-WEARING and ECONOMICAL. . . .

Sold by all Caterpillar Distributors.

WRITE FOR BOOKLET

## Martin Machine Company, Kewanee, Ill.



## 4500 tons of steel erected in a week

Bethlehem's erection crews have set another record in putting up the steelwork for one of the largest war plants in the nation, a bomber assembly plant covering 47 acres, somewhere in the Southeast.

The job called for fabricating and erecting the steelwork for five separate buildings. The largest structure, the main assembly building, is 1020 ft. wide by 2000 ft. long. The 28,119 tons of steel that went into this building were put up in 81 working days, or 2082 tons per 6-day week. In one week 4500 tons of steelwork were placed.

The week-by-week story of the work on this main

assembly building is told on the progress report above. Note how closely and consistently the line of actual erection follows

the line of estimated progress. And how the Bethlehem crews, after getting their second wind, got way ahead of estimated progress during the latter half of the job.

This huge bomber assembly plant is one of a large number of key war production plants fabricated and erected by Bethlehem. All of them have been constructed under full throttle. For a bomber, a tank, or a ship today may well be worth ten tomorrow.



### Proceedings of 29th Highway Conference

The *Proceedings* of the Twenty-Ninth Annual Highway Conference, held at the University of Michigan February 10-12, 1943, has just been issued as a University of Michigan Official Publication. In addition to the papers presented at this Conference, covering the subjects of grade-crossing protection, what traffic authorities can do to conserve transportation, wartime problems of traffic law enforcement, the Davison Limited Highway, the Willow Run access-road system, and maintaining highway service in war-

time, the volume also includes a report on the annual business meeting of the County Road Association of Michigan, data on the conference program and attendance, and a summary of the work of the Transportation Division of the University's Civil Engineering Department.

Copies of these *Proceedings*, Vol. 44, No. 101, may be secured by those interested direct from the University of Michigan Press, Ann Arbor, Mich.

### Fire Prevention Week

As is customary, the calendar week including October 9, the anniversary of

the great Chicago fire in 1871, is designated as Fire Prevention Week. This year the dates are October 3-9, and this year fire prevention is more important than ever before.

In the National Fire Protection Association's booklet "Facts About Fire", it is pointed out that fire reduces our war production almost a million dollars a day. Any person who allows a preventable fire (and most fires are preventable) to occur is giving direct assistance to the enemy. Fire Prevention Week is but the beginning of a year of continuous efforts in conservation which should be a positive united program.

Contractors and state and county highway engineers are doing a splendid job in the conservation of equipment and materials, to make present stocks and machines keep on working for Victory. Don't let preventable fires on your jobs, in your shops, or in your homes, more than offset that contribution to the war effort.

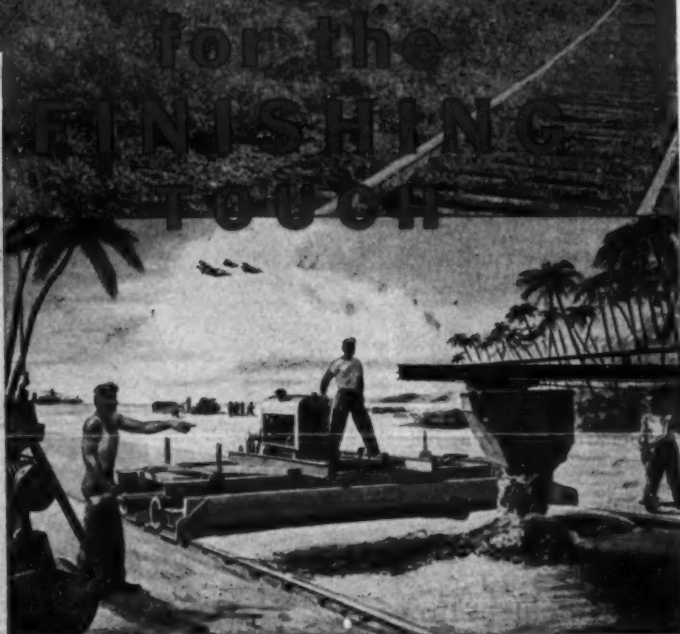
*Eighteen relief agencies are combined in the National War Fund, and so are the luckless war prisoners, the dauntless merchant seamen, the war orphans, and our own USO. You can give to all these by a single gift to the National War Fund.*

# OVERSEAS BOUND

## BLAW-KNOX FINISHING MACHINES

are doing a rapid and efficient job of mechanically surfacing concrete runways, taxi-ways and aprons for Allied military air bases all over the world—helping to put the *finishing touch* on the enemy. Teamed with the Blaw-Knox Concrete Paving Spreader as a running mate they are getting air bases built in record smashing time.

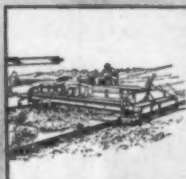
In addition to the shipment of Finishing Machines illustrated, large quantities of Blaw-Knox Airport Paving Forms, Concrete Spreaders, Bulk Cement Plants and Aggregate Batching Plants are rolling off the production lines to build the springboards to victory.



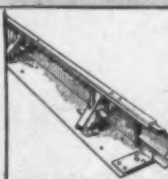
Consult your nearest Blaw-Knox Distributor for guidance in maintaining your Blaw-Knox equipment in good working order. Most items of Blaw-Knox Construction Equipment are available for domestic users on essential projects—within limits of government regulations. You can depend on your Blaw-Knox Distributor to handle your inquiry promptly and efficiently.

# BLAW-KNOX

**BLAW-KNOX DIVISION  
OF BLAW-KNOX COMPANY**  
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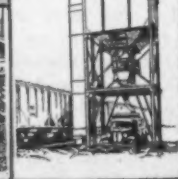
CLAMSHELL  
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SHEEPFOOT  
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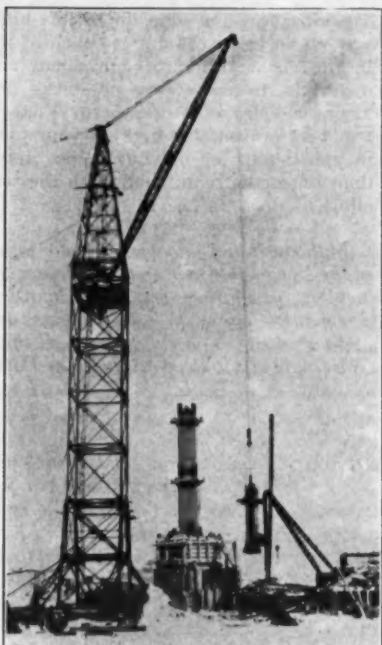
FOR VICTORY BUY U. S. WAR BONDS AND STAMPS

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Erection of the towers for the Peace River suspension bridge on the Alaska Highway was carried on on the ice and was completed just before the spring break-up.

## New Suspension Span Built on Alaska Route

(Continued from page 35)

Although there were several delays, the towers were put up at record speed and just in time to avoid disaster. The south tower was erected in three and a half days, while the higher north tower was completed in four days, on April 9. The ice went out on April 13-15, but not until after the erection tower had been dismantled.

### Personnel

The design and construction of the new Peace River suspension bridge on the Alaska Military Highway was under the direct supervision of the U. S. Public Roads Administration, Thomas H. MacDonald, Commissioner.

The contract for the construction of the foundations was awarded to Dufferin Paving Co., of Toronto, Canada, and that for furnishing, fabricating and erecting the superstructure to the John A. Roebling's Sons Co., of Trenton, N. J.

The bridge was completed and opened to traffic the middle of August.

## Report on Planning Future Construction

Among the committee reports presented and adopted by the Governing and Advisory Boards of the Associated General Contractors of America, Inc., at their meeting in Chicago June 28 and 29 was that of the Market Development Committee, of which Fred I. Rowe, of the W. L. Johnson Construction Co., Hicksville, Ohio, is chairman. This report established principles, objectives and methods to be followed by A.G.C. members in planning future construction markets.

As principles, the committee recommended that the A.G.C. "urge the promotion of construction of needed private and public projects which can be justified on the basis of the need from the standpoint of utility and their general cultural value; recommend to its client the use of the contract system with its skill, responsibility and integrity to secure the most to the owner for his money as well as to provide new business opportunities in the general economic fabric of both domestic and foreign fields of business; recommend that plans and specifications be prepared by qualified, competent and experienced architects and engineers; and the A.G.C. will freely exchange techniques of construction procedure to

the end that the private client and the public owner shall receive the most construction for the least money."

Objectives for the A.G.C. outlined in this report were to "point out the field of activity under which contractors' organizations can function during the war period and following military victory; to encourage the preparation of plans, specifications, the acquisition of right-of-way, and methods of financing construction; and to keep before private and public owners the advantages of having their construction work performed by contractors under accepted forms of contract."

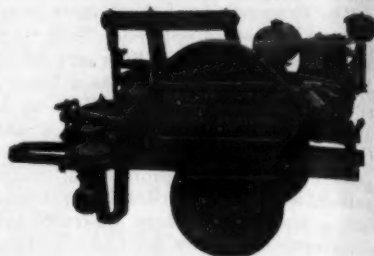
A report by a special planning committee of the A.G.C. Secretaries Council, headed by Roy A. MacGregor, Manager, Constructors Association of Western Pennsylvania, also was adopted. The report outlined activities for chapter secretaries to follow and emphasized the following points: "Care must be used in whatever efforts are made to develop work for the conversion period so that the impression is not left

with the public at large that this industry can and will absorb all of those who may become unemployed at the cessation of hostilities. Stress should be laid on the construction of needed worthwhile economically sound projects such as would add to the wealth of the nation and the convenience and comfort of its people."

### New Dragline Bulletin

Copies of Bulletin D, describing and illustrating the Dragliner, a new dragline bucket designed for speedy digging, fast filling and quick unloading, may be secured by those interested from the Daniels-Murtaugh Co., 620 C Ave. West, Cedar Rapids, Iowa. Among the features covered in this bulletin are the Dragliner's design for strength and durability, the round smooth front to cut digging resistance, the manganese-steel combination hitch plates and bumpers to take shock and protect the arch and drag hitches, and the design of the lips and teeth.

## 4" Single Mud Hog Pump on Pneumatic Wheels



The "Old Reliable" Mud Hog brought up to date.  
Gearing enclosed—running in oil.  
All cut gearing.  
Die-forged crankshaft in pump.  
Available for the duration in ball valve force type only. Flat valve open discharge discontinued for the duration.

Send for Bulletin No. CEM-40-E

**MARLOW PUMPS** RIDGEWOOD, NEW JERSEY

**MARIONS**  
**OFF TO WAR !!**

Carloads of MARIONS roll out of the company's yard daily to unrevealed destinations. They are heading for active duty on many fronts and under all kinds of operating conditions. In Africa, India, Britain, Alaska, Iceland and the South Pacific, MARIONS are giving a good account of themselves in every way in proven performance.

The Marion cranes shown above packed for shipment to sea-board and overseas service.

**THE MARION STEAM SHOVEL COMPANY, MARION, OHIO, U. S. A.**  
SHOVELS • DRAGLINES • CRANES • CLAMSHELLS • WALKERS  
PULL-SHOVELS • COAL LOADERS • STRIPPING SHOVELS  
GAS • DIESEL • ELECTRIC (From 1 Cu. Yd. to 35 Cu. Yds.)

**FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS**

### New Catalog Describes Steel Flooring and Steps

The features of Kerlow open steel flooring, grating, and safety steps are described and illustrated in a new 24-page catalog recently issued by the Kerlow Steel Flooring Co. Entitled "Industry's Magic Carpet", the catalog contains many large illustrations showing the proportions and construction of different designs of open steel flooring in a variety of uses, including armored flooring,

bridge paving, and safety steps. A standard safe-load table and sketch of a typical floor plan, together with complete dimensions of the various types of flooring and safety steps will assist engineers and construction men in selecting and laying out flooring for individual requirements.

Although steel construction is "out for the duration", contractors and engineers who are looking forward to post-war work will find this informative catalog of interest and use in formulating plans

for the future. Copies may be secured direct from the Kerlow Steel Flooring Co., 222 Culver Ave., Jersey City 5, N. J., by asking for Catalog MC 43 and referring to this item.

### High-Efficiency Welder Announced in A-C Field

A folder announcing the new Ampac "200" has just been released by Allis-Chalmers Mfg. Co., Milwaukee, Wis. This folder compares the four leading

types of transformer welders in their use of eleven important features, which include a wide welding range of over 200 amperes, over 85 per cent efficiency at normal loads, and all settings within six control turns.

Contractors, highway-department equipment-maintenance superintendents and others interested in complete technical and engineering data on this new alternating-current welder should write for the latest Ampac "200" A-C Welder Bulletin and mention this news item.

## You Can Produce More Concrete per Hour with Fewer Men with Heltzel Bulk Cement Equipment

Heltzel bulk cement plants are furnished for any type of concrete construction with storage capacities from 100 to 1500 bbls. in portable, semi-portable and stationary units.

The illustration in the upper left is the Heltzel Model E-2 Semi-portable Bulk Cement Plant furnished in 300 and 400 bbl. units.

The illustration at the bottom is the Heltzel Model E-1 Portable Bulk Cement Plant furnished from 100 to 250 bbls. capacity. A completely portable unit with the elevator "built in" the bin structure so the entire plant can be moved from one location to another without dismantling the batcher, elevator casing, chain or buckets.

Also shown is the Heltzel Portable Bulk Cement Recirculating Tank which is shipped completely assembled in 300 or 375 bbls. capacity. May be used in conjunction with either the Model E-1 or E-2 Bulk Cement Plant as well as any combination type batching plant.

The Heltzel combination type batching plant for batching all aggregates and cement in one operation is illustrated in the upper right hand picture. These plants are available in capacities from 100 to 400 tons with cement compartment capacities from 125 to 1000 bbls. These plants are fully illustrated and described in Bulletin B-31.

If your project is vital to our Victory Program, Heltzel Bulk Cement and Concrete Construction Equipment will help you speed up your concrete work.

INVESTIGATE!

### HELTZEL SUPERIOR CONCRETE CONSTRUCTION EQUIPMENT

MILITARY HIGHWAY FORMS

AIRPORT FORMS

CURB CURB AND GUTTER OR SIDEWALK FORMS

PORTABLE AGGREGATE BATCHING BINS — 30 TO 100 TONS CAPACITY

PORTABLE AND SEMI-PORTABLE BULK CEMENT BATCHING BINS FROM 100 TO 750 BBLs. CAP.

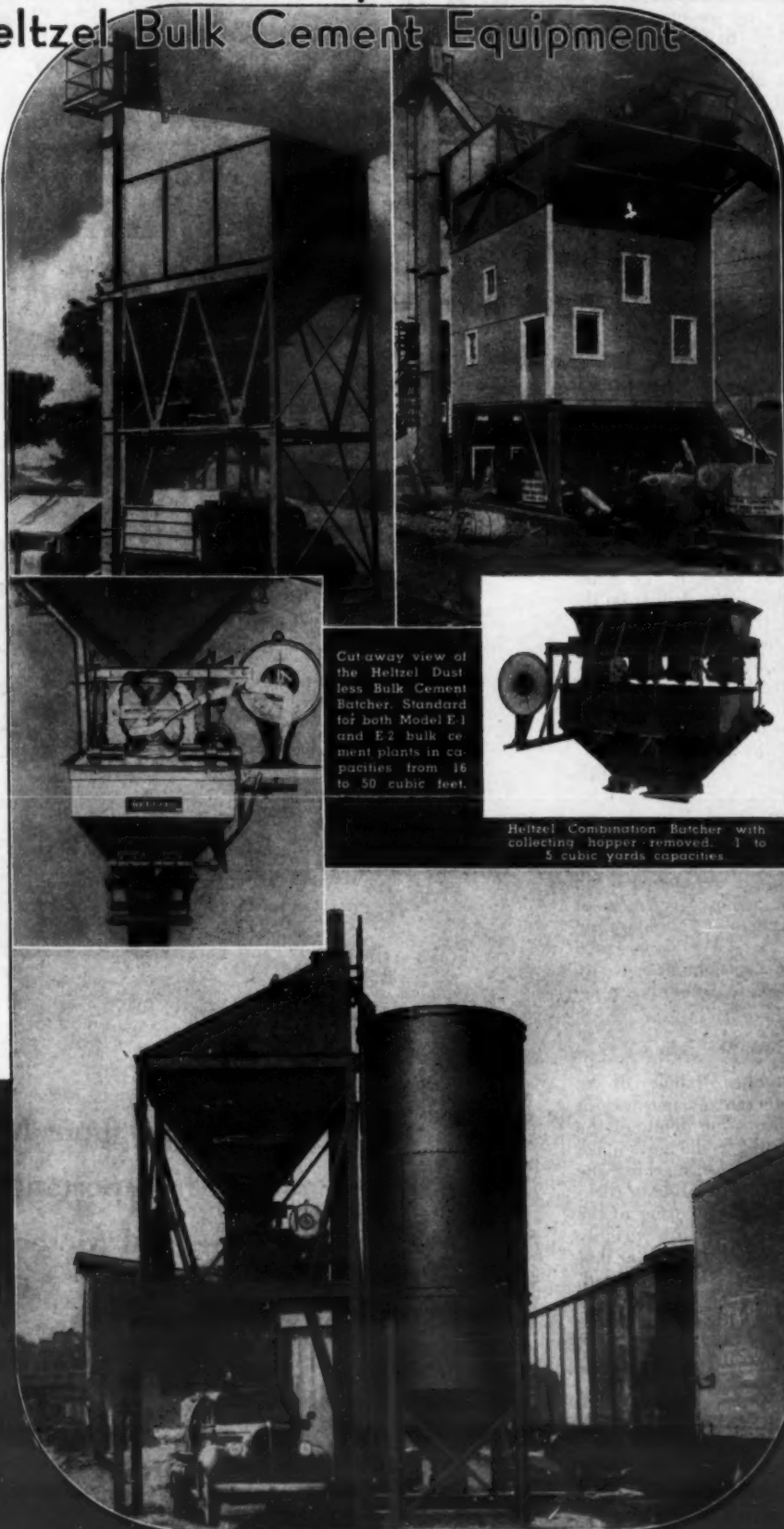
CENTRAL MIXING PLANTS

CEMENT TANKS TO 1500 BBLs.

TREMIE CHUTING

CONCRETE FLOOR HOPPERS

CONCRETE BUCKETS



Cutaway view of the Heltzel Dustless Bulk Cement Batchers. Standard for both Model E-1 and E-2 bulk cement plants in capacities from 16 to 50 cubic feet.

Heltzel Combination Batchers with collecting hopper removed. 1 to 5 cubic yards capacities.

**HELTZEL** STEEL FORM & IRON CO.  
WARREN, OHIO · U. S. A.

V4019

SEP

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XUM

## Some Do's and Don'ts For Operation of Drills

(Continued from page 43)

lips ground to a 59-degree angle. These lips must be kept sharp and of equal length—with the point in dead center—or the drill will cut a rough uneven hole. Many other types of twist drills are available, specially designed for various kinds and grades of metal, wood, and other materials. Twist-drill manufacturers will specify the correct bits for your work and furnish complete instructions.

A dull drill wastes your time and energy, and does slow unsatisfactory work. Return dull drill bits to the tool crib for resharpening; free-hand grinding can be done by an expert, but a twist-drill grinding fixture is best for perfect accuracy.

The drill bit should be lubricated when drilling all types of ferrous material except cast iron. In non-ferrous metals a coolant is desirable to reduce friction heat and prolong bit life. Consult cutting-oil manufacturers for the best type of lubricants to be used in each kind of metal drilling.

Because you may occasionally "get away" with excess loading of a drill, don't make the costly mistake of constantly overloading. A margin of safety in every drill will absorb accidental or emergency overloads, but constant abuse will soon cause serious and expensive damage.

Using a large heavy-duty drill on light work is also inefficient. It takes longer to do the work, it wastes electric power and your energy, and the weight and torque are likely to break the small drill bit.

If the drill stalls, it is being seriously overloaded or otherwise improperly used. Don't try to force it. Turn the switch off and remove the drill from the work. Determine the cause of stalling. Do not click the switch off and on in an effort to start a stalled drill. This damages the switch, overheats the motor, and may break the bit. To avoid stalling, relieve the feed pressure as the drill bit "breaks through" the finished hole.

Do you know why a drill chuck that is operated with a key has three holes for inserting the key? Your first thought would probably be that it is a matter of convenience to the user. The real reason is that by drawing the chuck jaws up from three points, a more even grip of the jaws is obtained than by using only one hole. Just as in closing a gasketed joint, the screws are tightened evenly all around to get evenly distributed pressure on the gasket.

### Electric Hammer Drills

In drilling a number of holes of the same depth in concrete or masonry it saves time to indicate the depth of the holes on the star drills. Some users make the mistake of nicking or marking the star drill with a file. Any filing or nicking of the drill, either at a corner of the shank or across one side, will invariably result in the snapping of the drill at that point. The reason is easy to understand. A strip of glass can be cut by scratching the surface and tapping the glass. Tool steel can be broken in the same way, and as star drills are made of forged steel, a nick or cut on the surface may lead to a fracture at that point.

A simple way to mark drilling depth on a star drill is to wrap friction tape around it a number of times. It makes an effective marker, no damage is done to the drill, and it can be quickly removed. Good forged-steel star drills average 50 inches of drilling in concrete, after which they should be redressed. Dull star drills not only slow up the drilling but result in more wear and tear on the motor because more time is necessary to accomplish the work. Star drills are hardened only at the drilling point so

that they will not snap off. Grinding the points removes the hardened metal, leaving the drills too soft for good service. For that reason, they should be redressed rather than ground or filed.

### If Tool Fails to Operate

If your electric hand tool fails to

operate, check the following:

1. Is your supply line dead? Check for blown fuses.
2. Are the plug and receptacle making good contact? Check for bent prongs and loose wires.
3. Examine the extension cord carefully. There may be a break in it.

4. Check the switch connection. If the switch does not seem to operate properly, check by connecting the switch leads to wires from the machine, thus cutting out the switch. In making this check on an electric saw, be sure the saw blade is removed or serious damage may result.

(Concluded on next page)

## ALL TRAILERS ARE NOT ALIKE!

Ask the salesman these questions!

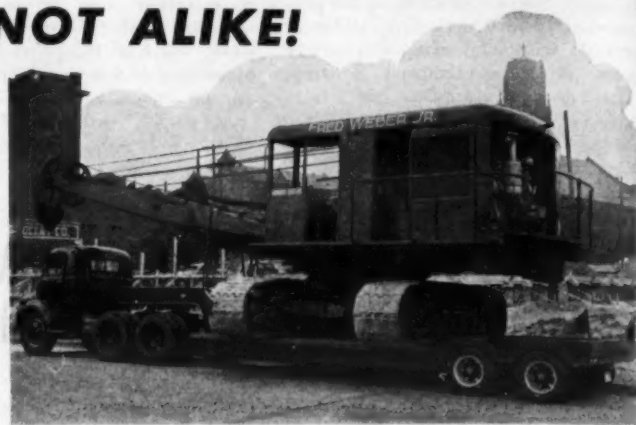
- Are the beams strong enough to carry the rated load without sagging after several months' service?
- Does the frame have enough cross members?
- Are the bearings, axles, and wheels of ample size and weight to carry the occasional overload and stand up under road shock?
- Are the radius rods, brake cross shafts and other points requiring lubrication bronze bushed?



These are just a few of the things to check before planning on your post-war trailer. But before you buy any trailer, check into the exclusive design of Jahn Trailers.

C. R. JAHN COMPANY  
1347 W. 37th Pl., Chicago

"Come to Trailer Headquarters"



## A NEW DAY DAWNS IN RAILROADING



Flow of war materials has more than doubled the normal volume of freight hauled by the Western Pacific Railroad from Salt Lake City to San Francisco through the Feather River Canyon. Wherever the going is toughest on this rugged route, General Motors Diesel freight locomotives are the "commanders" of motive power which keep this vast stream of vital munitions moving steadily toward the men who will mop up Hirohito.



Construction is entering a new day too. War building is being rushed ahead with reliable General Motors Diesel power. And in the days to come this dependable, rugged, economical power will be ready to do the hard jobs of peace.

Here is a crack "Express Train" of 1865 as pictured by Currier & Ives. Four years later an important new era in our transportation and economic history was celebrated with the completion of the first railroad linking the Atlantic and Pacific.

Throughout history, wars have set up new milestones of transportation progress. And with this war, it is the General Motors Diesel Locomotive that is ushering in the new era. What advances the future will bring are already apparent in the present performance of these locomotives and the way they are helping to meet the abnormal demands upon the railroads today.

BACK THE ATTACK—WITH WAR BONDS



LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.  
ENGINES...150 to 2000 H.P....CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio  
ENGINES...45 to 250 H.P....DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

## Manufacturers' Help In Right Care of Tools

(Continued from preceding page)

5. Are both brushes touching the commutator? Check the brush-spring tension, carbon length, and brush contact. Brushes should slide easily in the holder for proper contact.

If, after checking all the above points, the tool will not operate, take it or ship it to the nearest service station for that make of tool, giving complete information in a separate letter if the tool is shipped.

### Buying Used Tools

A second-hand tool offered for sale at a low price may look like a bargain. The fact that it needs a new armature, or a new switch, or a new field, or a new chuck, might not be apparent until after the tool is put to use. Tools bought "as is" involve a considerable risk, but today, with the severe shortages of tools, there is a great temptation to take at any price any tools which are available. However, it is strongly urged that such purchases be made only from reputable dealers.

Tools that are taken in trade by the manufacturer or his accredited distributor, put through the repair and maintenance department for replacement of worn and broken parts and given a new tool test, offer a good value to the buyer who lacks the high priorities needed to purchase new tools.

### Helpful Literature

Among the available free literature to

assist users of electric hand tools to get the most service with a minimum of repairs are the following: "The Portable Electric Drill—Its Proper Use and Care", published by Black & Decker Mfg. Co., Towson, Md.; "Thor Maintenance Manual for Electric Drills", issued by Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, Ill.; "The Care and Maintenance of the Mall Saw", available from Mall Tool Co., 7740 South Chicago Ave., Chicago, Ill.; a wall reference card "Operation and Maintenance of Porter-Cable Speedmatic Saws" and a "Saw Manual" from Porter-Cable Machine Co., Syracuse, N.Y.; "The Van Dorn Portable Electric Saw Handbook", by Van Dorn Electric Tool Co., Towson, Md.; and "Electric Tool Facts", published from time to time for the users of portable electric tools by Wodack Electric Tool Corp., 4627 West Huron St., Chicago, Ill.

The service and field engineers of the companies whose literature is listed above, as well as of Skilsaw, Inc., Chicago, Ill., and Stanley Electric Tool Division, The Stanley Works, New Britain, Conn., have made valuable suggestions in the preparation of this article.

### River Bed Mud-Capped For Pipe-Line Trench

Recently, near Somerville, N. J., the bed of a shallow stream 165 feet wide was mud-capped to break a 12 to 18-inch layer of hard material to form a trench for one of the new west-to-east oil-carrying pipe lines. Ordinarily the hard bottom would have been drilled and shot, but the layer was too thin to make this method economical, leading to a novel method of placing the dynamite by the

contractor, O. C. Whitaker Co., of Fort Worth, Texas.

At Somerville a cable sufficiently long to reach across the stream was loaded at intervals of 2½ feet with cartridges of du Pont 60 per cent gelatin dynamite, 4½ in diameter and 16 inches long. The cable was then pulled across the stream, the cartridges lowered to the bed of the creek, which was only about 5 feet below water level, and bags filled

with sand placed on top of them to form the mud-cap.

When the dynamite was shot, the hard surface of the stream bed and the muck and dirt below it were thrown into the air. A parallel ditch 12 feet upstream was then shot in the same manner with the same amount of dynamite. This resulted in a ditch over 5 feet deep and 10 feet wide in which the pipe for this vital oil line was laid.

## Para-Plastic

**HOT-POURED RUBBER-LIKE  
WATERPROOF  
SEALING COMPOUND**

After many months of research Serviced has developed a VICTORY PARA-PLASTIC composed of non-critical materials (no rubber) and conforming fully with Federal and Civil Aeronautics Association specifications.

VICTORY PARA-PLASTIC bonds firmly with concrete, steel or wood and serves as a joint or crevice sealer against infiltration of water. It is not affected by ordinary extremes of summer or winter weather.

To ENGINEERS AND CONTRACTORS: Additional information and specifications on request

SEND FOR CATALOG OF COMPLETE FACTS

**SERVICED PRODUCTS CORPORATION**

Pioneers in the Manufacture of Approved Construction Materials for over twenty-three years.

6051 West 65th St.

Chicago, Ill.



## ... WHEN Pumps MUST GET GOING FAST!

Not an instant to waste! It takes quick action to fight roaring flames—or to stop rising water! That's when portable pump units, powered by quick-starting gasoline engines, get into quick action. Another of the many standard and special assignments for hundreds of thousands of rugged, dependable Briggs & Stratton engines now doing valiant duty with our armed forces.



Briggs & Stratton 4-cycle, air-cooled gasoline engines are now being produced for hundreds of wartime uses. The same high quality and the same precision that have built for Briggs & Stratton an international recognition as making "the world's finest air-cooled gasoline engines," are maintained regardless of new production peaks.

Soldiers, sailors and fliers have now joined the millions of civilian users in proclaiming, "It's powered right — when it's powered by Briggs & Stratton."

BRIGGS & STRATTON CORP.  
MILWAUKEE 1, WISCONSIN, U. S. A.



A  
CYCLE



ENLIST YOUR DOLLARS  
BUY WAR BONDS

## Get a pay load every trip... even in wet digging

★ It's easy enough to move *more material, faster*, when you're using HENDRIX Lightweight Buckets! So step up your yardage in all kinds of digging by replacing old buckets with HENDRIX Lightweights. You gain a 20% to 40% weight advantage over other buckets, type for type... which permits the use of larger buckets on your machine, regardless of normal capacity... larger buckets on long boom operations, too. In wet digging, you get extra bonus pay loads by leaving the water in the pit. Manganese steel chains, fittings and reversible tooth points are standard equipment on all buckets. Write for literature or ask your dealer.

### Three Types

light, medium and heavy duty  
⅜ to 20 cubic yard sizes



THE FIGHT'S NOT OVER YET!  
KEEP SCRAPPING... BUY BONDS



Lightweight

HENDRIX  
DRAGLINE  
BUCKETS

DESOTO FOUNDRY, INC. • MANSFIELD, LA.

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## Section Man's Garage Serves Kansas Roads

(Continued from page 15)

the shop equipment.

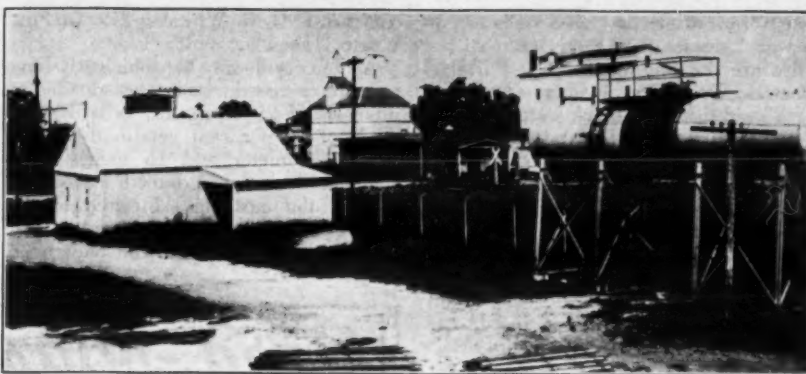
Just outside the offices, near the entrance, is the gasoline pump, and set attractively in a grass plot with a group of cannas is a high flag pole flying "Old Glory".

In the long narrow yard which is completely enclosed with a high wire fence is storage space for numerous trucks, snow plows, motor mowers, and other equipment. A wooden ramp for loading the heavy parts into the large trucks plays an important part in the yard equipment.

The District Supervisor has about twelve men working out of the garage on field work and normally only three men in the garage: himself, the district clerk, and a mechanic. Scattered throughout the three counties covered by this District are about fifty additional men as section men handling the detailed field work of maintenance.

### A Section Man's Garage

The accompanying illustration shows a typical garage built by the state for the use of section men. It is a galvanized-iron structure large enough to house any two pieces of equipment, such as graders and trucks. In addition there is a small lean-to for putting mowers, mixers, and other small equipment under cover during the time they are not in actual use. For each of the section men's garages and at other vantage points, the state purchased old tank cars and dismantled them, putting the tanks on elevated steel



Kansas State Highway Commission Photo

A section man's garage, outside storage shed, and elevated tank for asphaltic material at Blue Rapids, Kansas.

frames so that there could always be a sufficient storage of asphaltic material at each necessary point for prompt repairs of the roads. Needless to say, this was done several years ago, well before the present shortage of tank cars for handling fuel oil, gasoline, and other petroleum products. In addition, some of the section garages have smaller tanks for storing diesel fuel.

### Highway Trucks Aid Ohio Food Canners

The assistance rendered to the farmers of Ohio by the Department of Highways in furnishing tractors to speed plowing after the long wet spring turned out to be of great help in the food program in the Buckeye state.

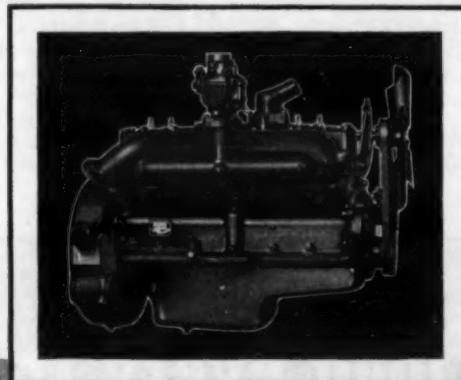
Another program has recently been inaugurated for further assistance to Ohio food industries. There are in Ohio quite a number of canneries engaged in packing foodstuffs such as corn, tomatoes, peas, cabbage, and sauerkraut. The can-

ners are confronted by a very serious problem in getting sufficient trucks to haul the crops from the farms to the canneries. They expect to have enough equipment for normal days but during the hot days, when the crops ripen quickly, there may be insufficient transportation available.

Ordinarily, the canneries go out and hire a few extra trucks during such emergencies. This year, however, there are no "few extra trucks"; consequently, the Ohio Department of Highways has arranged to let the canneries use state trucks during periods of emergency. This may be for a day or two at a time, or it may be for late-afternoon and evening hauling. The drivers will be paid by the canners, who will also pay for the trucks on a per-hour rental.

In a number of cases, the canning factories are very short of labor. The Ohio Department of Highways has also arranged the working schedule of its maintenance employees so that some of them may work a few days at a time, on a staggered basis, in the canneries. They may also, if they wish, work a few hours in the late afternoon and evening after their work on the highway has been completed. The program has been worked out in such a manner that it will not seriously interfere with any of the state highway maintenance operations, but it will be of distinct value to the canners.

## WHERE THE NAVY HAS TO NAVIGATE RUGGED TERRAIN



### ... a WAUKESHA ENGINE powers this Available Six-Wheel Wrecker built for Naval Ammunition Depot

★ Any job that the Navy gives to a wrecker anywhere around a naval ammunition depot is a tough job. Whether it's handling big shells... huge guns... or one of the many general utility jobs... it's always heavy hauling!

But when the terrain around that depot is "rugged" that wrecker had better be built like a battleship and powered accordingly.

This six-wheeler is! Specially built by Available Truck Co., Chicago, for this particular Navy job... it is powered with a Waukesha Engine. Super-power... smoothness... speed... stamina—with dependability. That's why Waukesha Engines power so many war vehicles of the very latest type.

For Automotive, Industrial and Stationary Power, Waukesha Gasoline and Oil Engines range from 5 hp. to over 300 hp. Get Bulletin 827.

★★★ FOR VICTORY... BUY WAR BONDS AND STAMPS ★★★

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.  
NEW YORK • TULSA • LOS ANGELES

**WAUKESHA ENGINES**

## OSGOOD AIR CONTROL

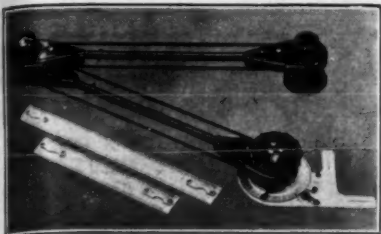
**OSGOOD** recommends the continued purchase of War Bonds and Stamps—and the observance of preventive maintenance to keep your machinery running.

the smooth, velvety, effortless control force with the operating ease and efficiency of steam. OSGOOD Air Control is simple in operation, easy to maintain, and costs next to nothing. Even though our production schedule is full—now is a good time to check on OSGOOD Air Control.

The  
**GENERAL**  
EXCAVATOR CO.  
SIZES: 1-1/2 to 12 Tons  
Diesel - Gas - Electric  
Associated with  
THE OSGOOD CO.

The  
**HERCULES**  
COMPANY  
HERCULES  
"IRONROLLERS"  
6 to 12 Tons  
Diesel or Gasoline  
Associated with  
THE OSGOOD CO.

**OSGOOD**  
SIZES: 1/2 to 2 1/2 Cu. Yd.  
Diesel - Oil - Gas - Electric  
SHOVELS  
DRAGLINES - CRANES  
Crawler & Wheel Mounted  
THE OSGOOD COMPANY, Marion, Ohio



The Vemco Junior Drafter.

### A Drafting Machine For Portable Boards

A new small drafting machine that can be mounted on a portable board and used in the field is being produced by the V & E Mfg. Co., 789 So. Arroyo Parkway, Pasadena 20, Calif. Through the use of new shock-resistant plastics, this Vemco Junior weighs only 3 pounds and furnishes an accurate parallel motion over the entire board. It has a full circle base-line setting, pre-lubricated and double-sealed ball bearings, and enclosed pulleys.

Disk brakes at the anchor and elbow allow the drafter to be used on steeply inclined boards. The central skid button is plastic and does not mar the paper. Light-weight aluminum scales are available in 8 and 12-inch lengths and fit into resilient slotted chucks in the positive scale holder. The protractor is  $3\frac{3}{4}$  inches in diameter and graduated in degrees with figures by quadrants.

The Junior Drafter is now selling on priority orders, but full information may be secured by contractors and engineers direct from the manufacturer by referring to this descriptive text.

### What a Kwh Does for You

Everyone knows that electric hand tools accomplish a great deal at the minimum expenditure of energy by the operator. While considering these tools under operation, we came across the following facts which you may have known for some time but which were refreshing.

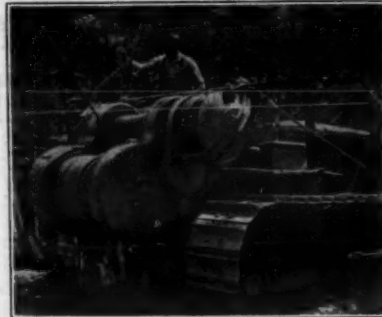
One kilowatt-hour is equivalent to 2,655,200 foot-pounds of work. An

average man of 150 pounds expends 75,000 pounds of work in ascending the stairway of the Washington Monument, which is 500 feet high. Thirty-five trips would equal the foot-pounds of work done by one kilowatt-hour of electricity. One kilowatt-hour represents more muscular work than any man can do in one day, and the cost of one kilowatt-hour is from 2 to 5 cents.

### New Tractor Donkey For Heavy Service

A new model tractor donkey has been put into trial operation by Willamette Hyster Co., 2902 Clackamas St., Portland, Ore. The new model, Hyster D7L, is designed for any type of donkey work, including pile driving and operating dragline or slackline scrapers, as well as for operating a skyline or in logging. For this service it is mounted on a Caterpillar D7 tractor.

The unit has three cable drums, main, haulback, and strawdrum, with two op-



The new model Hyster tractor donkey for a Caterpillar D7 on its initial trial installation.

erating speeds on each. The main drum spools 960 feet of 1-inch cable and has an available line pull in low gear of over 30,000 pounds. The haulback and straw-line drums are in proportion. This new model, which replaces the former Hyster D7N tractor donkey, has been released for production by Hyster engineers.

Complete information and costs may be secured direct from the manufacturer.

PAN AMERICAN PERFORMS  
*Black Magic*



### Turns Jungles Into Airports Practically Overnight!

Building air bases on routes to the world's battlefronts, Pan American Airways has battled sand and mud, jungle and desert in South America ... Africa ... Asia ... and on many of the islands in between!

In this company's vast experience, "seamless" bituminous runways have proven most adaptable because they are swiftly constructed, ready for immediate use and capable of handling all types of aircraft from speedy pursuit planes to huge transports.

As you draw up post-war plans for airports, highways and streets in

your community, benefit from the many advantages of bituminous construction. *Resilient*—easy on the passengers. *Non-glare*—for protection and comfort of driver or pilot. *Safety surface*—minimizes skidding, with less wear on tires. *Durable*—lasts for years under heavy traffic. *Low-cost*—more all-weather surfaces for less money. New booklet outlines road-building experiences during past ten years in U. S. A., describes reasons for strong trend toward "seamless" bituminous construction. Send for your free copy today!

**ETNYRE**  
**"Black Topper"**  
BITUMINOUS DISTRIBUTORS



E. D. ETNYRE & CO., MAIN PLANT AND OFFICE, OREGON, ILLINOIS, U. S. A.



... always noted for  
*Distinguished Service*

●No medals have been handed out for distinguished pumping service, but CARVER *Certified PUMPS* are being "decorated" daily with the highest award there is in the construction equipment field—repeat orders.

These continued repeat orders from the men who have judged and compared CARVER performance under every condition is convincing proof that CARVERS *do* deliver "distinguished" service—steady, low-cost pumping with less downtime from pump trouble. If you haven't the facts about CARVER pumps, see your distributor NOW!

Carver Pump Co., Muscatine, Iowa



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## Small Equipment Roster Serves N.M. County Well

(Continued from page 11)

ticular condition can quite easily be excavated.

All of the bridges on the county highway system are of creosoted-timber construction. The shortage of treated timber has led to the adoption of a creosote oil for painting the untreated timber now available and it has proved quite successful. It penetrates the green lumber to a depth of  $\frac{1}{8}$  to  $\frac{1}{4}$  inch, while dry timber takes up the oil to a depth of  $\frac{1}{2}$  inch.

The county has a small roster of equipment but uses it most effectively and maintains it in the best of condition. The Dodge pick-up truck that Mr. Winter was operating at the time we met him had over 96,000 miles on the odometer and it ran as smoothly as though it had run only 5,000 miles. Expert care in the county shops is the answer to that.

The grader-blade situation is serious for the county because of its large mileage of gravel roads that have to be bladed regularly to keep them in good shape. They were fortunate in having laid in a fair stock of 12-foot blades, enough for at least a year ahead, and they also have a large stock of 5-foot blades which can be used on the county's pulled grader when the larger graders are down for want of tires or blades. It takes more trips over a road to maintain it with the shorter blades but the job will be done anyway. The county uses two 6-foot blades on a 12-foot mold-board on its No. 11 Auto Patrols.

The equipment includes: 2 Caterpillar No. 11 power graders; 4 dump trucks of  $1\frac{1}{2}$ -ton capacity; 1 Dodge  $\frac{1}{2}$ -ton pick-up truck; a Caterpillar Thirty-Five tractor with a LeTourneau bulldozer; a Galion No. 110 pulled grader with 10-foot blade; a  $\frac{3}{8}$ -yard P&H dragline with a 35-foot boom and a P&H trailer, for transporting the dragline, which has been planked over so that it may be used to haul the tractor; a Jaeger  $3\frac{1}{2}$ -S and a CMC 5-S concrete mixer, the former being remounted on a two-wheel pneumatic-tired trailer for ease in moving; and a considerable variety of small tools. A hand-operated winch was purchased and mounted on an old truck chassis with a steel bed and at the rear a boom mounted with an adjustable pipe stiffleg so that heavy loads may be lifted in the field. At the rear of the truck an extra set of small wheels is provided to prevent the load from raising the front wheels of the truck off the ground.

A clever outfit for cutting bridge timber was developed by the shop crew. It consists of a wood bed 20 feet long on four sets of rollers running in pairs of channels so that the entire bed may be moved with the timber being cut. It is equipped with a 5-hp Allis-Chalmers motor to drive the 18 and 30-inch circular saws. This is set up at the Road Department yard adjacent to the 8-compartment timber rack, measuring about 20 feet square, which will store about 20,000 feet of lumber off the ground.

Operating in the field, a single crew, which starts out at 6 in the morning for a specific road-maintenance job, usually consists of one power grader, two dump trucks of  $1\frac{1}{2}$ -ton capacity, the three operators and the Road Superintendent. The labor required, usually not

(Concluded on next page)

## YOU CAN LOAD and UNLOAD YOUR TRUCKS—FASTER ! ! !

and SAFER  
with

## ANTHONY HYDRAULIC "TAILGATE LOADER"

★ ★ Pays for Itself ★ ★

### ● SAVES MANPOWER!

One man now does what 3 or more formerly did.

### ● CUTS LOADING AND UNLOADING TIME!

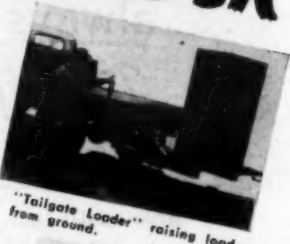
Trucks are loaded and unloaded faster—keeps them on the move.

### ● REDUCES HERNIA ACCIDENTS!

Loads are lifted to body or lowered to ground by powerful hydraulic hoist mechanism controlled by one convenient lever.

### ● STOPS ACCIDENTAL DAMAGE TO VALUABLE MERCHANDISE!

No skids, chains or cables to break or slip. Minimizes your damage losses.

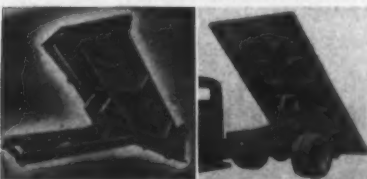


"Tailgate Loader" raising load from ground.



"Tailgate Loader" automatically stops at floor level and ground.

### ANTHONY HYDRAULIC HOISTS and BODIES



LEFT—Anthony Hydraulic WAR MODEL Hoist Dump Bodies—are available.

RIGHT—Anthony Hydraulic ZB Boosters for Platform Bodies, also Platforms with Hoists.



"Tailgate Loader" locked up to body. Gate can be used conventionally.

ZB BOOSTER HOIST MAKES DUMP BODY OUT OF YOUR PLATFORM

**ANTHONY COMPANY INC.**  
STREATOR, ILLINOIS  
NOW IN OUR 25th ANNIVERSARY YEAR  
WRITE NOW FOR COMPLETE DETAILS DEPARTMENT 66

TESTED and APPROVED for use on high tensile strength wire rope, by Underwriters' Laboratories—official testing laboratories for insurance companies.

ONE SAFE-LINE CLAMP is designed to hold any wire rope without slipping. WIRE ENDS ENCLOSED. No needle-sharp wire ends, nuts and bolts exposed to injure workman's hands.

STREAMLINED! Will not catch on clothing nor on mechanical apparatus. Will not foul.

HOLDS A TIGHT THIMBLE. When thimbles are used they will not loosen and fall out.

## SAFE-LINE

WIRE ROPE CLAMPS

THAT'S WHY IT NEVER SLIPS



ONE Clamp Does It

FOR ROPE SIZES  $\frac{1}{8}$  TO  $\frac{3}{4}$

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Write for details of this—the only PERFECTED wire rope clamp on the market. Used by the Armed Forces and thousands of industries.

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## A big mouthful with every bite

In dirt, clay, coal, gravel or ore you can rely on one of the tough, properly designed, Brownhoist buckets to take a full load with every bite. Extra large sheaves reduce rope wear to a minimum. Brownhoist Buckets are available in rope-reeve, power-wheel and link type. For prices and further facts write INDUSTRIAL BROWNHOIST CORPORATION, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.



## EQUIPMENT FOR SALE

### Automobiles

1 Ford Coupe, 1936, Ser. #2463844, Model 58

### Boilers

1 Lidgerwood Vertical Steam Boiler, Ser. #10226, 42" Dia. Pressure 125 lbs.

### Buckets

1 Williams Clamshell,  $\frac{1}{2}$  Cu. Yd., Type M20, Ser. #7287, Multiple Rope

1 Hais Clamshell, 1 Cu. Yd.

1 Blaw-Knox Clamshell,  $\frac{1}{2}$  Cu. Yd. Size 673, #313452

1 Blaw-Knox Clamshell,  $\frac{1}{2}$  Cu. Yd. Size 671, #AA1936

1 Hais Clamshell, Rehandling,  $\frac{1}{2}$  Cu. Yd. #2690 Multi Sheave

1 Hayward Dragline,  $\frac{1}{2}$  Cu. Yd. Ser. #236

### Cranes & Shovels

1 Bucyrus-Erie Crane, Model GA2, Ser. #10404, 1929, 55 Foot Boom

1 Bucyrus-Erie Crane, Model GA2, Ser. #10271, 1929, 55 Foot Boom

Concrete Equipment, Bins, Vibrators, Etc.

4 Ingersoll-Rand Vibrators, Size IV, Ser. Nos. 15083, 14941, 15345 and 15350

2 Mall Gasoline Vibrators, Ser. Nos. 82358 and 82691

### Jack Hammers, Chippers, Etc.

1 Ingersoll-Rand Chipping Hammer,  $\frac{1}{2}$ " hose connection, Ser. #61055

1 Ingersoll-Rand Paving Breaker, Type CA35, Ser. #499335

2 Ingersoll-Rand Jack Hammers, Ser. Nos. 513053 and 513155

2 Ingersoll-Rand Tampers, Air, No. 34, Ser. Nos. 21757 and 21018

2 Ingersoll-Rand Tampers, Air, Ser. Nos. 23848 and 21874

2 Worthington Air Tampers, Ser. Nos. 13656 and 13327

### Pumps

1 Moretrench Water Pump, Ser. #2102 with 65 Centrifugal Pump #41009, powered by Hercules Gas Motor, Model JXC, Eng. Size  $3\frac{1}{2}$  x  $1\frac{1}{2}$

1 Jaeger Pump,  $1\frac{1}{2}$ ", Ser. #23420

1 Rex Pump, 2", Model 10-M, Ser. No. BB1506, with Wisconsin Motor, 1 Cyl. Type AE, #112644

1 Homelite Portable Pump, 2" 250 Feet 8" Discharge Pipe and 50 feet header pipe 8" with couplings, Tees, Valves, Elbows, Reducers for Moretrench Pump, mostly new

### Miscellaneous

1 Set Pile Hammer Leads, length 20 feet, to 24 McKiernan-Terry #7 hammer

1 Austin-Western Scraper, Model XAH-100-D, Ser. #12362, 12 Cu. Yd. Waukesha Motor #423947

1 Austin-Western Scraper, Model XAC-100-C, Ser. #12354, 12 Cu. Yd. Waukesha Motor #406834

1 Bucyrus-Erie Sheepsfoot Roller, Double, Model No. 112, Ser. #30913

1 Bar Bender, Ewelco, Type B

1 Bar Bender, equipped with dies up to 10"

1 Delco Lighting Plant, Model A-D-1, 5000 Watt, 110 Volt DC, Ser. #5031, 4 Cyl. Gas Engine

1 Delco Lighting Plant, 5000 Watt, 110 Volt DC, Continental Motor, 4 Cyl. Gas Engine

1 Holt Lighting Plant, 110 Volt, Ser. #5034

1 Holt Lighting Plant, 110 Volt, Ser. #1513

1 Dodge Dump Truck Body, 3 Cu. Yd.

1 Ingersoll-Rand Sump Pump, Size 2 $\frac{1}{2}$ ", Ser. #8020

Approx. 20,000 Feet Lumber sizes from 3"x12" to 12"x14" in lengths from 4' to 24'

Black Annealed Tie Wire

670 Pounds No. 3

1900 Pounds No. 18

Dump Trucks

15 2-yd. Dump Trucks, first-class condition.

H. F. McLEAN, Inc.

Corning, New York



C. & E. M. Photo  
Gordon Winter, Superintendent of the  
Bernalillo County, New Mexico, Road  
Department.

## Convenient Small Shop In Bernalillo County

(Continued from preceding page)

more than 8 men, is hired from near the location of the work. Two similar crews may be worked at the same time in different parts of the county. When building fill, the dragline is used or at times the tractor and bulldozer build the fill itself, using material from the ditches along the right-of-way.

### The County Shop

The county has a yard 437 x 120 feet on the outskirts of Albuquerque, in which it has a storage garage 30 x 80 feet and a connecting shop 30 x 35 feet, all of galvanized-iron construction with wood trusses for the roofs. In the shop is a heavy I-beam between two trusses with a Chisholm & Moore chain hoist for lifting heavy engines and other parts. Wide doors at either end permit running the equipment to be overhauled in from the direction most convenient for the work to be done. A metal-top work bench down one side contains the smaller tools, including a Black & Decker 1/2-inch electric drill rigged as a drill press, a B-D power grinder and buffer, a Snap-On valve-grinding outfit, and beneath the bench a group of heavy drawers for socket wrenches and other tools, all of which are equipped with locks. A heavy

vice permits the handling of heavy parts while working on them. A large number of the tools are hung at the back of the bench while the heaviest, and those used less frequently, are mounted on a large A-frame rack in the grease room. A smaller 1/4-inch Black & Decker electric drill and an Allen portable electric welder complete the equipment in the shop proper.

Adjacent to the shop is a welding room 15 x 25 feet where there is an Echols Bros. portable acetylene generator with the oxygen cylinders on the rig, a hydraulic press made with the hydraulic unit from a Root spring scraper, and on the same press there is a clamp for using the larger of the Black & Decker drills with the pressure of the hydraulic unit behind it. There is a double grinder for larger material with a Century motor and a power hack saw set up here where space was available.

In the grease room, in addition to the tool rack, there is storage space for the grease required, anti-freeze, bins for

bolts and cap screws, and a Lincoln pneumatic grease gun. The original shop 30 x 80 feet is now used for storage of equipment and as a sign shop and carpenter shop, with the Gardner-Denver garage compressor for all air needs installed at the side. Here also is a considerable stock of cement, the two gasoline pumps, and a Weidenhoff battery charger.

In summer the blacksmith shop is set up outdoors with the forge and anvil. It is moved indoors as soon as the weather makes such a step advisable. Also outdoors is a 200-gallon diesel fuel tank resting in a channel frame with four rollers so that it may be moved easily onto the 6-foot bed of a pick-up truck. It has a hand pump for delivery of the fuel.

### Personnel

Gordon Winter is Superintendent of the Bernalillo County Road Department, and Clarence B. Beyer is County Road Engineer and Surveyor.

## Cut Material Costs

### Reduce Placing Time

### Get Stronger Concrete

with **Mall** TRADE MARK

# VIBRATORS




**GASOLINE POWERED 3 H.P. UNIT**

Equipped as a Concrete Surfer



- ★ Place a stiffer mix faster.
- ★ Eliminate honeycombs and voids.
- ★ Get a better bond with reinforcement and a stronger water tight job.
- ★ Strip forms earlier.

● MALL Gasoline Powered Vibrators are the most useful tools any contractor could own. They are ruggedly constructed to stand up under hard, continuous usage. They operate in the most remote places. They can be wheeled anywhere on the job. In addition, the variable speed engines start easily, run all day on very little fuel and require little attention.

8 swivel-fitted attachments, quickly interchangeable with the vibrating element are available for Wet Wall Rubbing, Form and other Sanding, Sawing with Circular Saw, Wire Brushing, Grinding, Drilling in Wood, Brick, Steel or Stone, Pumping and Sharpening Tools. With the present scarcity of time, labor and materials and a competitive future facing you, the need for this equipment was never greater. Write at once for full information.

## MALL TOOL COMPANY

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Offices and Distributors in Principal Cities

★ Immediate delivery on Gasoline Powered 1 1/2 H.P., and wheelbarrow or round base mounted 3 H.P. units on suitable priority.

Placing a Stiff Mix Concrete



## It's Design That Makes The Difference

There's a vast difference between "just another plant" and a really successful installation; and that difference can be expressed in just two words: Engineered Design.

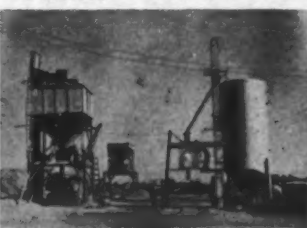
The symbol above is your guarantee that whatever Butler equipment you may be interested in will be *right* for your job, because it is *engineered* to fit the specific installation. Whatever your equipment needs may be, be sure to consult your Butler engineer—let him show you how Engineered Design will save you time and money. Write for literature today.

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**BUTLER BIN CO.** WAUKESHA WISCONSIN

PLANTS • BULK CEMENT TRANSPORT • CARSCOOP • CENTRAL

MIXING PLANTS • SAND AND GRAVEL PLANTS



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Clip the coupon for your copy of the NEW bulletin on  
**BLACKHAWK  
HYDRAULIC  
EQUIPMENT**



FREE

### HYDRAULIC HAND JACKS



No need to assign several men to each jacking job — one man can operate any Blackhawk Jack — even the brute 50-tonner! That's only part of the big story on why Blackhawk 3, 5, 8, 12, 20 and 50-ton Jacks can help you beat those schedules!

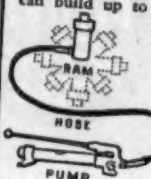
### GAUGE JACKS

The most practical, economical and portable field testing equipment available. Tell whether materials, soil or structures can "take it."



### PORTO-POWER REMOTELY CONTROLLED JACKS

Something revolutionary in Hydraulic Jack design. Works in all directions! One unit can build up to any practical length — eliminating need for miscellaneous jacks and dangerous, cumbersome blocking up. Sure it lifts — but Porto-Power also PULLS, SPREADS, CLAMPS, BENDS and PRESSES! Hundreds of amazing uses around every construction project. Available with 7, 10, 20 and 50 tons of power.



### PIPE BENDERS

Stop worrying about getting factory formed bends and elbows, or losing time in "belly wrestling" pipe. Low-cost Blackhawk Benders handle up to 4" pipe.



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BLACKHAWK MFG. CO.  
Dept. M2093, Milwaukee, Wisconsin  
Rush your new Hydraulic  
Equipment Bulletin V-43 to us.

Name.....  
Company.....  
Address.....  
City and State.....

V4019

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## Equipment Care Will Help Lick Snow Drifts

(Continued from page 31)

snap as it meets a frozen obstacle, many engineers prefer a preformed type of wire rope for use on cable-controlled snow plows, V's or wings. Preformed wire rope successfully resists fatigue, even sub-zero fatigue which is an enemy of steel, and is engineered to take punishing shocks as well.

### Check-Up After Work

When the day's work has been done and the roads have been cleared, snow-removal equipment should not be parked and forgotten until the next snowfall. Warm quarters in a heated garage or shop will keep lubricants in a fluid condition and make it easier to start the machine for its next assignment. At the end of the day, the battery and radiator should be checked and the fuel tank filled to the top. A quick check will reveal any broken screws, bolts or obvious need for repairs. The operator of the machine can assist materially if he will mentally note and report any unusual noises while the machine is working.

Not only should the machine be checked for signs of wear or strain at the garage, but it should be oiled and greased. In changing oil, always remember that total hours of operation, not total mileage, should be the determining factor. Most engineers find that written records are helpful in making inspections, oil changes, and lubricating at regular intervals. Here again, it should be emphasized that the manufacturer's instructions should be followed to a let-

ter. The oils and greases which he approves are recommended only because they meet certain conditions peculiar to his machine. If a certain type of oil is specified, use it.

### Conservation Essential

Conservation of snow-fighting equipment is a combination of common sense, application of approved maintenance methods, and cooperation between the department and the man in the cab. Proper handling and proper care of snow-fighting equipment can tide you over until the war is won and insure open roads throughout the year.

### Automatic Control For Stand-By Engines

Internal-combustion-engine power plants are now automatically furnishing power for necessary emergency services, such as fire protection, water supply, lights, radio, etc., in many essential services, including airports, municipal installations, isolated power plants on construction work, for the operation of bridges, and for unwatering highway underpasses. All of these services are provided by stand-by internal-combustion engines, which start to operate immediately when electric power fails.

Synchro-Start Products, Inc., 221 East Cullerton St., Chicago, Ill., which devotes its exclusive production to automatic engine control, has recently published an illustrated booklet describing the types of work in which Synchro-Start automatic controls and their dependability offer much in the way of safety at the time of power failures. Copies of this booklet "Automatically Controlled Gas, Gasoline and Diesel Engines—Their Part in Offense and Defense" may be secured from the manufacturer.



## Speeds Maintenance and Repair Work — Makes New Roads Out of Old



A copy of this pocket-size BITUVIA manual will be sent on request.

● The speed with which BITUVIA can be applied, together with its other properties, makes it the logical material for war-time maintenance and repair work. BITUVIA penetrates deeply and binds firmly, assuring long, economical service. The resilient, skid-resistant BITUVIA surface contributes to safe driving and longer tire-life. Standard grades to meet all Federal, State, County and Municipal specifications.

### PLASTUVIA CRACK FILLER

This plasticized filler binds firmly to brick and concrete, sealing cracks and openings and preventing water damage. PLASTUVIA will not flow or pull in summer, nor chip in winter.

## REILLY TAR & CHEMICAL CORPORATION

Executive Offices: Merchants Bank Building, Indianapolis, Indiana  
2513 S. DAMEN AVENUE, CHICAGO, ILLINOIS 500 FIFTH AVENUE, NEW YORK, N. Y. ST. LOUIS PARK, MINNEAPOLIS, MINN.  
SEVENTEEN PLANTS TO SERVE YOU

"The more it carries the more it can pull"

That's what they've said about LINN Haftraks since 1916. And LINN's basic traction method is now doing double duty for the Allied Nations by means of LINN Traktrailers.

SINCE 1916

**LINN**

CONTOUR-FOLLOWING TRACTION

THE LINN MANUFACTURING CORPORATION  
MORRIS NEW YORK

Under the pitiless drive of war, Buffalo-Springfield rollers help to build our fields of flight. Theirs is the job of fashioning long, smooth runways to speed the take-off and ease the landing of our bombers and fighters. That is the assignment of the Buffalo-Springfield roller in the United Nations drive to Victory, an assignment of which the builders are justly proud.

THE BUFFALO-SPRINGFIELD ROLLER COMPANY  
SPRINGFIELD, OHIO

**BUFFALO-SPRINGFIELD ROLLERS**

## ONE "QUICKIE" SALVAGE JOB ISN'T ENOUGH . . . YOU'VE JUST BEGUN TO SCRAP!

"Once over lightly" doesn't even begin to turn up the full scrap potential of the average industrial plant. Tremendous quantities have been either neglected or overlooked. It's amazing what the second and third time around will yield when everybody is convinced that you mean business.

Use It—Sell It—or Scrap It! Maybe you can't use some good machinery—yet it hasn't reached the scrap stage. Okay—sell it. Usually somebody else is looking for that equipment. You'll get prices far better than those for scrap. And you'll do your Uncle Sam a good turn into the bargain.

### How to Sell Your Scrap

If you have no regular scrap dealer, find one in the classified phone book. He'll buy usable materials, too; or you can find a Used Equipment Dealer in the same place.

Don't expect your scrap heap to be a gold mine—the dealer works under a price ceiling, the same as you do. But you will find there's a million dollars' feeling in the knowledge that you're doing your part all the way.

BUSINESS PRESS INDUSTRIAL SCRAP COMMITTEE  
Room 1261, 50 Rockefeller Plaza, N.Y.C.



The new Circo cutting tool for making circular grooves for metal ring connectors in timber construction.

### Cutting Tool Speeds Modern Wood Projects

The rapid increase in timber construction of aircraft hangars, barracks, bridges, and other structures essential to the war effort has been greatly accelerated by the use of bolted ring-connector joints which increase the load-carrying capacity of timber structures, and prevent bending and shearing of the bolts, vibration, and "settling" of the structure.

An improved tool for cutting the circular grooves for the rings or bearing plates has recently been announced by the Circo Tool Co., 264 E. Ogden Ave., Milwaukee 2, Wis. In preparing timber for ring-connector joints, circular

grooves are cut concentric with the bolt holes in the rabbetted overlapping ends of the timbers to be joined. The depth of the grooves is about half the width of the rings. Before the joint is assembled, the rings are inserted in the grooves on one of the joining timbers; then, as the timbers are drawn together by tightening the through bolts, the protruding rings in one face enter the grooves in the other face. The larger bearing area of the rings utilizes a much greater percentage of the bearing strength of the wood than when bolts are used alone.

This new cutting tool is designed particularly to speed up this type of construction and eliminate some of the tedious hand labor. The circular-groove cutter is made with either two or four renewable blades for split rings from 2½ to 6 inches in diameter, and may be driven by a portable electric drill or drill press, or may be used in a hand-operated brace and bit. A different type of cutting head, with inside blades, is furnished to countersink bearing plates of the same diameter as the connector rings.

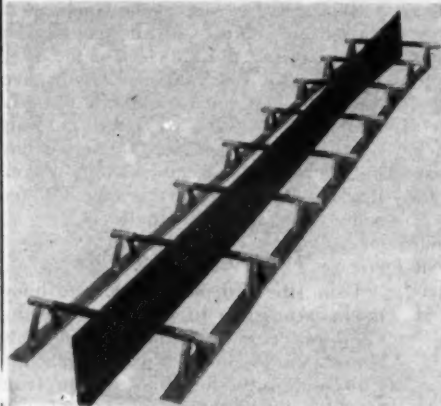
Further information on these cutting tools may be secured by interested contractors and state and county highway department engineers direct from the manufacturer by mentioning this item.

### New Hose Co. Manager

Announcement has been made by the Boston Woven Hose & Rubber Co., Boston, Mass., of the appointment of W. F. Dashiell as Southern District Sales Manager. Mr. Dashiell, who has been associated with the company for many years and for the past 15 years has represented it in Richmond, Va., will have direct charge of sales in the southern territory, with headquarters at Richmond.

For ease of assembly and speed of installation of expansion and contraction joints,

## use TRUS-ASSEMBLY



It brings extra profits to the contractor by reducing installation costs to a minimum;

also saves the government money by eliminating maintenance expense caused by inaccurate alignment of dowels.

Write for circular

**HIGHWAY STEEL PRODUCTS CO.**

Chicago Heights, Illinois

## 4F SHOVEL PARTS

*Reclassified to 1A!*

Steady Self-Hardening prolongs life of wearing parts—is easy to apply—bonds equally well with Manganese or Cast Steel.



When shovel parts become worn and efficiency is lost, they can be rebuilt to last longer than new. How?—by protecting these areas filled in with high carbon or manganese electrodes with highly wear-resistant Steady Self-Hardening. Deposits of this alloy on worn shovel parts give greater wear resistance than original factory parts—and double the life of parts built up entirely with manganese or other ordinary electrodes.

Steady Self-Hardening is an alloy of chromium, manganese, carbon, molybdenum and iron, having exceptional toughness, hardness and wear-resistance. It bonds equally well with cast steel and manganese, can be readily forged, and is perhaps the easiest of all hardening electrodes to apply. The price—50¢ per pound, F.O.B. Whittier, California. Priority requirements are AA-4 or higher. A trial order of 100 pounds will prove the merits of Steady Self-Hardening on wearing shovel parts. Order today!

**STOODY COMPANY**  
1101 WEST SLAUSON AVENUE • WHITTIER, CALIFORNIA



**CASE HISTORY:** New Tumblers for this 2½ yard shovel lasted only 4 months and the contractor was able to obtain another 4 months' service by rebuilding with high carbon electrode. An additional application of Steady Self-Hardening over the high carbon, however, increased service to 1½ years. Steady Self-Hardening provides comparable life extensions when applied to idlers, pads, teeth and bucket lips.

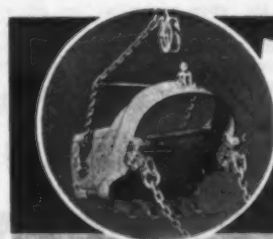
**STOODY HARD-FACING ALLOYS**  
*Stop wear... Eliminate Repair*



**PAGE AUTOMATIC BUCKETS DIG IN NOW!**

• Page Buckets answer today's call for speed on all earth-moving jobs, because, automatically, they dig right in, doing more work per shift. The result is lowered cost of operation—INCREASED PROFITS for you! It's the AUTOMATIC feature of a Page Bucket that causes it to strike first on its forward arch, and rock back on the teeth, ready for the first pull of the load line to start the bite! It's the AUTOMATIC feature that enables it to outdig any other dragline bucket of equal size and weight.

*Boost Production... Keep America Strong*



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**DRAGLINE BUCKETS**

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43

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## Paving and Finishing Newest Flight Strip

(Continued from page 41)

drove out from the bulk-cement plant, they stopped at a platform in front of a box car where one man emptied the bags of natural cement onto the two batches of the truck and then covered them with tarpaulin.

About 10 cars of aggregates and 3 cars of portland cement were handled each day and a car of natural cement every two days. The cars were moved at the siding by car jacks instead of the usual pulling by a crane, one of the batch trucks, or an extra tractor. Equipment is too scarce these days to warrant letting an extra piece remain idle most of the time just to handle such work.

### Pouring the Slabs

The paving schedule was set up to pour 4,000 feet of 12½-foot slab 8 inches uniform thickness in two days so that the entire paving operation would be complete in 24 working days for the 12 strips making up the 150-foot runway. This was almost accomplished but the delays caused by the continuous rains of the spring of 1943 in this section made it necessary for the contractor to hold the paving outfit for 42 calendar days or about 18 days longer than planned.

The contractor ran two pavers boom to boom operating from the outside of the forms and each pouring half of the depth of the slab. On the first, a Multi-Foote 27-E paver, was the operator and one man dumping batches. One man sprinkled the grade and also moved the hose line along the adjacent slab, keeping it out of the way of the batch trucks. Water from the local domestic supply was provided through a pipe laid about 25 feet from the paving. The hose for the paver was held up by a length of 2½-inch pipe fastened to the frame of the paver to leave a clear space for the trucks without the need for boarding the hose or damaging it by constantly running over the unprotected hose. There were two puddlers and two men spading along the edges. One of these men shoveled off the grout and concrete that dripped from the chute and bucket onto a wood tray carried on the paver frame. This was shoveled over into the space

between the forms instead of being left on the slab or subgrade on which the paver was running.

The second paver was a Koehring 27-E with which worked two puddlers and two spaders. When pouring a strip alongside one already open to traffic, the trucks used the completed strip and ran off the slab over a ramp of planks which was pulled ahead by one of the trucks as required to keep up with the pavers. The pavers averaged 1,830 feet of the 12½-foot slab 8 inches thick in a 9-hour paver day. The best run for a single day of 9 hours was 1,920 feet. This was not quite up to the anticipated 2,000 feet a day, but delays from weather were so great that the loss of an average of 170 feet a day is remarkably small.

### Finishing and Curing

Using the two pavers boom to boom made it possible to keep the finishing operations close to the pouring. A Blaw-Knox double-screed finishing machine with one man shoveling to the front screed followed the second paver and at no time carried a roll of concrete larger than customary, so well was the placing of the concrete calculated. Either 33 or 34 batches were required per 120-foot panel between expansion joints. The batches measured 1.09 cubic yards per batch with 1.60 barrels of cement per cubic yard.

A Koehring Longitudinal Finisher worked behind the double-screed machine and was operated so as to minimize the spilling of concrete over the edge of the forms. On so many military projects visited last summer, we noted that these mechanical "bull-floats" were run over the edge, wasting a considerable roll of concrete on every pass. This is particularly unfortunate when the slab is sloped for drainage, as it inevitably results in pulling concrete from the high side and pushing it off on the low side.

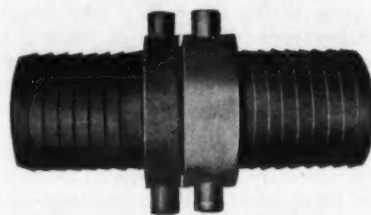
The hand finishing was done by two men with long-handled 10-foot drag straight-edges, followed by two men edging the pavement. The hand finishers used a slotted float across all expansion joints to insure a smooth-riding surface. Two of these men cut the dummy joints at 20-foot intervals by using a structural-steel angle ¼-inch thick with 2-inch legs. One leg was attached to a 2 x 4 and the other impressed into the fresh concrete to cut the slot into which a ½ x 2-inch plate was inserted. One man was kept busy cleaning off concrete spilled over onto an adjacent slab to insure a clean

job free of roughness.

One joint man pulled the steel plate

behind the last finishers and edged the  
(Concluded on next page)

## The Easy, Economical Way . . . to Connect SUCTION and WATER HOSE



### "KING" Malleable Iron SHANK COUPLINGS

Strong, carefully made couplings of uniform quality, threading and dimensions. Easily inserted in hose and quickly connected and disconnected. Shanks have deep, clean corrugations. Pin lug swivel nuts are well recessed to hold washer when hose is disconnected. Heavy Pattern (Illustrated) has shanks long enough for two clamps, and pin lugs on both male and female ends. Sizes 3" to 8", inclusive. Regular Pattern has pin lugs on female only, and shanks designed for one clamp. Sizes 1½" to 3", inclusive.



SINGLE BOLT

DOUBLE BOLT

### "KING" HOSE CLAMPS

The strongest clamps of their kind, and easiest to attach. Bolt lugs are heavily reinforced. Tongue, and ears for vise jaws, are full width of clamp. Perfect conformance to hose circumference, with broad bearing surface, insures equally distributed compression when clamp is tightened, without cutting into hose cover. Double Bolt style has quadruple take-up. . . . an exclusive DIXON feature that provides exceptional gripping power. Sizes: Single Bolt, for hose ¾" to 5¼", O.D.; Double Bolt, for hose 3½" to 17¼", O.D.

DIXON products are carried in stock by manufacturers and jobbers of mechanical rubber goods.

Buy WAR Bonds . . . Buy MORE Bonds . . . For VICTORY!

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VALVE & COUPLING CO.

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BRANCHES:  
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## FORM-TY ENGINEERING FACTS

*Factors other than  
the Tie itself,  
govern the final  
cost of Ties in  
the wall.*

### COMPARISON DATA

SYSTEM	TIE	Safe Load	Tie Length	Weight per Unit		Cost per Unit		
				Tie Only	Work- ing Parts Total	Tie Only	Work- ing Parts Total	
Prefabricated	½" Tyroscs	6000#	10"	.34#	2.94#	\$3.28#	\$1.08	\$3.39
	A.C. Form-Tys	3000#	29½"	.38#	1.73#	2.11#	\$1.05	\$1.18
	Snap-Tys	3000#	29½"	.38#	1.44#	1.82#	\$1.05	\$1.14
Field- Assembled	Band Iron	1500#	36"	.39#	.86#	1.25#	\$1.03	\$1.20
	½" Rod & Clamps	5000#	36"	2.0#	3.62#	5.62#	\$1.08	\$1.60
	¾" Tilt Lock	5000#	10"	.32#	8.5#	8.22#	\$1.45	\$1.48

§ Includes built in spreader unit.

¶ Includes Spreader Plates for Form Spreading.

† No provision for spreading forms.

\* Includes Tyroscs for Form Spreading (10%)

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# Flight Strip

(Continued from preceding page)

joint. All edging marks along the sides of the slabs as well as joints were removed by brushing with a whitewash brush so that the area would present a uniform appearance from the air and be more easily camouflaged. The pavement was not roughened by brooming because of the greater loss of rubber on each landing under these conditions. Instead, the concrete was given a fine texture by pulling a piece of burlap over the slab after the last hand finishing was complete.

The pavement was cured by the Hunt Process, with a generous and uniform application of the asphalt to seal in the water of the mix and prevent evaporation during the initial curing period.

## The Office Building

Unique among the features of Flight Strip projects to date is the inclusion of a wood-frame custodian's building as a part of this contract. It was erected as the first part of the project, providing an office for the Resident Engineer during the autumn and winter months with adequate heating and sanitary facilities. It is a simple structure 36½ x 24½ feet in plan with a large room, used for a drafting room during construction, a smaller room for dressing, and a small office for the engineer. This will become the house for the custodian of the Flight Strip when it is placed in service.

## Major Quantities

The major quantities involved in the construction of this Flight Strip were as follows:

Unclassified excavation (balanced cut and fill)	350,000 cu. yds.
Trench excavation	14,000 cu. yds.
Sewer pipe, vitrified tile, 12-inch	4,200 ft.
Sewer pipe, vitrified tile, 15-inch	3,700 ft.
Sewer pipe, vitrified tile, 18-inch	3,750 ft.
Sewer pipe, vitrified tile, 24-inch	100 ft.
Pipe underdrain, 6-inch	12,000 ft.
Pipe underdrain, 8-inch	3,700 ft.
Portland cement	29,000 bbls.
Natural cement	3,650 bbls.
Miscellaneous iron and steel (castings for latching basins)	10,000 lbs.
Unreinforced concrete pavement	14,850 cu. yds.
Top course, BMM, Type 6 (2-inch surface on access road on soil-cement base)	7,400 sq. yds.
Bituminous material T, road tar	27,000 gals.
Bituminous material T, surface treatment, access road	5,700 gals.
Screed gravel	5,000 cu. yds.
Cobble gutter for open ditch	35 sq. yds.
Latching basins	40 total
Soil-cement pavement, bituminous surface treated	33,400 sq. yds.
Soil-cement foundation course	7,300 sq. yds.
Lean shoulders	300,000 sq. yds.
Paved bituminous macadam for top of French drains	1,120 cu. yds.

## The Access Roads

An access road, 24 feet wide and 2,200 feet in length, was constructed to permit entry of vehicles from an adjacent highway. In the original design the road connected with the runway at the end, but this was altered at the request of the Army Air Corps. This road has a soil-cement base and a bituminous surface treatment. Another road also gives access to the Flight Strip from an existing street on which is located the custodian's house. The surfacing of the street was somewhat damaged by hauling prior to the opening of the new access road so that it was resurfaced as a part of the contract.

Adjacent to the Flight Strip at either end, running from the concrete to the access roads, are two areas 237 x 75 feet for the fueling of planes without interfering with the use of the Flight Strip.

## Personnel

The entire project was designed by the engineers of the state highway department subject to the Flight Strip specifications of the Army Air Corps as administered by the Public Roads Administration. Since this is construction for the defense of the Nation, we are not permitted to publish the location, nor the names of the personnel connected with the work.

## More Materials Allotted To Transportation Industry

The country's transportation industry has been allotted a substantial increase in the amount of carbon steel and other necessary controlled materials by the War Production Board under the Controlled Materials Plan for the fourth quarter of this year, it was announced recently by the Office of Defense Transportation.

In making this announcement, the ODT, which acts as the claimant agency for domestic transportation under the CMP, disclosed that the transportation industry will receive 1,380,000 tons of carbon steel for "A" products for the fourth quarter as compared with 1,200,000 for the third quarter, and a request of 1,590,000 tons. Requisite amounts of other metals were also allocated for use with the steel.

Of this total, the railroad industry will receive the largest share, getting 400,000 tons of replacement rail, 240,000 tons of track accessories, and 300,000 tons of other maintenance materials.

ODT's claimant-agency duties were

enlarged this quarter when it was authorized to claim materials for automotive replacement parts. The WPB Requirements Committee allocated 88,000 tons of carbon steel and related amounts of other materials to be used with it for automotive replacement parts. The amounts allocated are materially larger

than in any previous quarter, although less than ODT requested.

In the matter of materials for new construction and facilities, the WPB granted the amount asked for. ODT officials said that particular attention would be devoted to railroad construction projects in the Western defense area.

do the shovels you're using . . .

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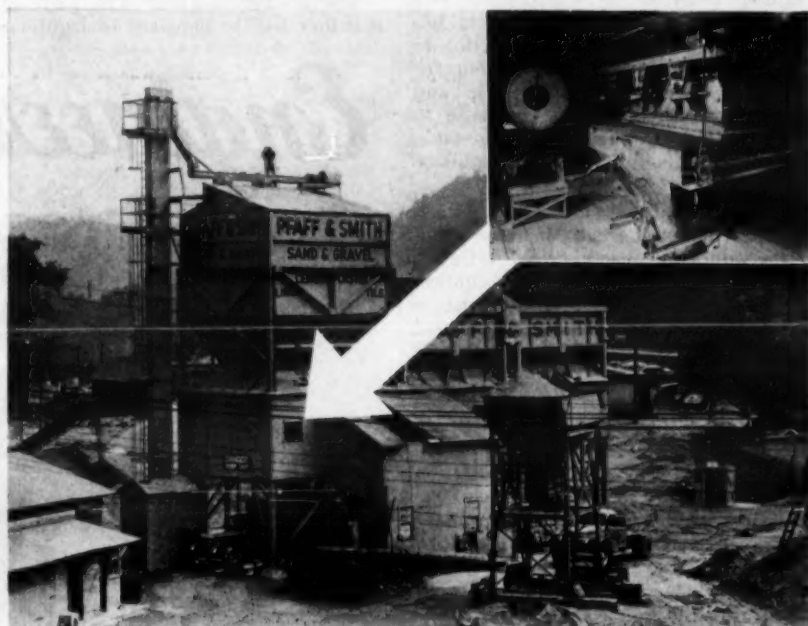


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Look for this Mark of STERLING Quality

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## RR Outlines Plans For Future Program

(Continued from page 36)

and "is contingent on the railroad's ability, through adequate fares and relief from burdensome property taxes, to amortize the necessary investment and earn a reasonable net return". Thus one public utility comes forward with a post-war program for improved service without recourse to Federal funds.

Among the features of the improvement program covering equipment and roadbed are: ease curvatures in the present electrified territory, as well as on new extensions, to permit faster schedules and smoother riding; heavier rails throughout the system and better ballast for smooth easier riding at faster speeds and greater cleanliness; additional double-deck cars for greater seating capacity; modification of present motors and controls for smoother starting, faster acceleration, and easier riding; cleaner travel as steam locomotives are retired throughout the system by the extension of electrification; tight-fitting easy-operating metal window sashes to keep out dirt and drafts, with shatterproof glass; efficient modern exhaust fans for better ventilation; parcel racks for bundles and coats; improved seat covering for greater cleanliness; and the purchase of new modern electric cars and trailers for electrification.

The proposed electrification extensions by half-decade increments include: 1945-50, East Williston to Oyster Bay, 13.1 miles; Mineola to Babylon, 18.3 miles; Hicksville to Northport, 14.8 miles; Babylon to Patchogue, 17.2 miles; 1950-55, Northport to Port Jefferson, 18 miles; Bethpage Junction to Ronkonkoma, 20 miles; 1955-60, electrification extended to Manorville and Speonk; 1960-65, from Manorville to Greenport and Speonk to Montauk, diesel multiple-unit cars would replace steam trains.

It is believed that completion of such a program would greatly increase property values in many areas, bringing additional revenues to the counties, which the railroad feels would justify a reduction or elimination of railroad property taxes.

### A Freak Program

During testimony before a House Appropriations subcommittee on the Interior Department's new appropriation bill, during May, 1943, Secretary of the Interior Ickes said that he had only approved enactment of authorization for a second road to Alaska with the understanding that work on it be deferred until after the war.

"As a matter of fact," he said, "I would be inclined to suggest to the Army Engineers that instead of another highway they build an elevated railroad all the way across so that they would not have all this trouble with snow and ice, bogs and all that sort of thing. Originally they would have to use wooden piles."

### Flood Protection for RR's

Railroad spokesmen told a Senate

Committee in June that a vast plan of rehabilitation and relocation of railroads is necessary to protect them against interruption of transportation by floods. The damage to railroads and the interruptions of service caused by the spring floods this year were described, and it was declared that unless preventive measures are taken, the nation will face recurrent flood emergencies. They spoke in favor of legislation introduced by Senator Harry L. Truman of Missouri which would authorize the Reconstruction Finance Corp. to make interest-free loans to railroads damaged in the 1943 floods and assist them in taking steps to prevent future damage and stoppage of railroad traffic.

It is estimated that the railroads suffered damage in the 1943 floods amounting to \$10,000,000. In some cases, it was pointed out, future protection of rail lines will involve the construction of new bridges, some lines will have to be entirely relocated, and others will have to be elevated above the flood plain.

The protection of the railroads against the damaging effects of floods and disruption of service is important, but in many instances our planned flood-control program would correct these evils, without an additional flood-control program being launched by the railroads themselves. While in some instances the railroads have special flood problems of their own, a nationally coordinated and integrated flood-control program will prevent flood damage to the railroads as well as protecting crops, businesses, highways, and human lives from the ravages of floods. (See C. & E. M., July, 1943, page 2, for article on post-war flood-control program.)

### Railroads' Fears

The oft-expressed fear of the railroads that they will be deprived of legitimate

business after the war smacks of the pre-war campaign waged constantly against highway and waterway development "under government subsidy". Such an attitude is unbecoming a transportation institution of the size and maturity of our railroads, and shows a tendency to forget franchises, land grants, and other subsidies that started the infant railroads on their careers.

The introduction written by Harry A.

Wheeler, President, Railway Business Association, for the book, "Transportation—Prewar and Postwar", by P. Harvey Middleton, Vice President, and published by the Association, epitomizes the fear of competition expected by the railroads in post-war years after their almost complete monopoly of transportation during World War II.

"The post-war competitive struggle (Concluded on next page)



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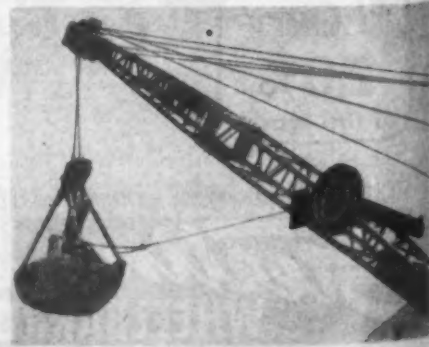
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The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearings and fewer sheaves, the saving on cable alone would eventually pay for it. Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

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## Definite Plans Needed For Post-War RR Work

(Continued from preceding page)

will be severe, and the percentage distribution of the whole traffic will change, by subtracting from the railways and adding to the volume of each competing form of transportation. But while the railways cannot expect to hold their present proportion of the whole traffic volume, they may retain in the post-war period a larger proportionate volume than in the previous years, if they modernize their plant, operating methods and rate structures. And they will have the opportunity to do so as that which has become obsolete is discarded and they install the improvements which the manufacturers and the mechanical and engineering staffs of the railways will cooperatively have ready for their adoption at the end of the war.

"There are, however, certain factors in the transportation situation that are a part of the post-war planning program of the government which directly affect the non-railway carriers and also have an important bearing upon the competitive conditions of the railway group. Mr. Middleton has told what is being planned by the government in the extension of highways, waterways, and airways as a part of its post-war program to broaden the employment base through public works expenditures. These suggested outlays so definitely tend to increase our basic transportation facilities that they must be reckoned with as a part of the competitive structure with which the railways will be further confronted. If carried out, these public expenditures will magnify the possibilities of increased subsidized competition."

### Conclusion

Let us all be thankful that we may expect free competition after this war, both in America and in the world. If the Nazi hordes had overrun the Americas as they did Europe, there would be no freedom of any kind to look forward to. Our railroads, serving and served by highway and water transportation, will remain the basic long-distance heavy-hauling utility of the nation. There is no more sense to the pleas for protection from so-called government subsidies for highways and waterways than in the fears already expressed by some highway transportation agencies that the airplane will swoop down and carry off the major portion of its freight. Each means of transportation will carry that portion of the nation's goods which it can move with the desired speed for a price that is justified by the service performed. If the waterway, the railroad, or the highway cannot provide the speed required for a particular shipment, then the airplane will carry it. Don't forget that you pay 10 cents extra on a 3-cent base rate to secure special delivery for your mail, and another 3 cents if you wish it to be flown.

In the post-war period, if plans are made now on a broad scale and coordinated to the nation's needs and best interests, there will be business enough for all forms of transportation. The most constructive action which can be taken now by all transportation agencies is to try to see the future transportation problems of the country as a whole and on that basis lay their plans for so modernizing and improving their particular branch that each will take its share of the burden and the business, thus providing the best and most satisfactory transportation for all needs as well as giving employment to as many people as possible throughout the nation.

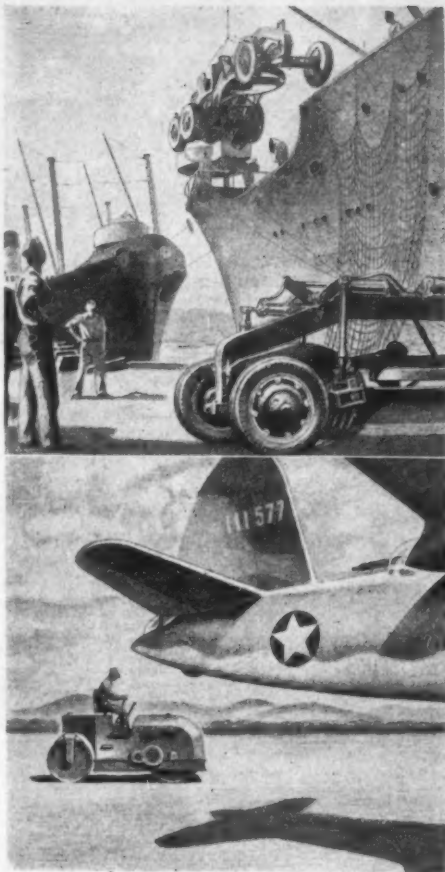
At present, we can report no definite projects of railroad construction or reconstruction because, as already pointed out, planning for the post-war period by

the railroads has not yet reached that stage. And unless the railroads, like all other industries and agencies, realize the importance of making plans now to meet the post-war problems and requirements, then it is entirely possible that their fears of post-war competition will have some basis because other transportation agencies have had the foresight to advance their plans to the blueprint stage in order to be ready to provide the best

and most modern transportation service for the post-war world.

*We are now in the second six months' period of 1943. The need for scrap will be greater than ever. The Allied offensive is going to require a tremendous amount of war material which means the steel mills will have to supply more. Get in all your scrap now. Let's all pull together for a quicker victory.*

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## MARINES

Our fighting forces must get a heap of satisfaction out of the fact that here on the home front there are tough, hardened working men and women . . . as dependable as themselves. If we are to help them turn on the lights of the world again we must continue to fight back here—continue to go all out on the production lines.

When we read of victories it is easy enough to become complacent and self-satisfied. Actually this is bad for us—winning a race does not always mean winning at the races. Let's keep on serving our armed forces—doing the kind of a job that will lead the Marines back to Wake and Guam—that will bring them all home sooner. In doing this—let's keep our wicks clean for that brighter light in the future.

Galion continues to serve with essential equipment for the Air Force, Coast Guard, Engineers, Marines, the Navy and the Seabees.

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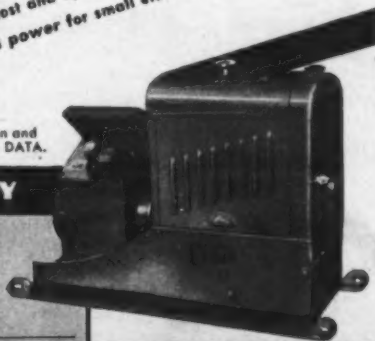
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XUM

# Contractors and Engineers Monthly



C. & E. M. Photos

Step-by-step picture story of patching a weak spot in a Virginia bituminous-concrete highway, using a cold pre-mix patching material with hot-patch results. Upper left, cutting out a pavement break with a mattock. Lower left, drying out the hole with a torch. Above, warming the pre-mixed patching material at the roadside. Upper right, placing the heated patching mix in the hole. Lower right, crowning the patch with a hot shovel. See page 6.

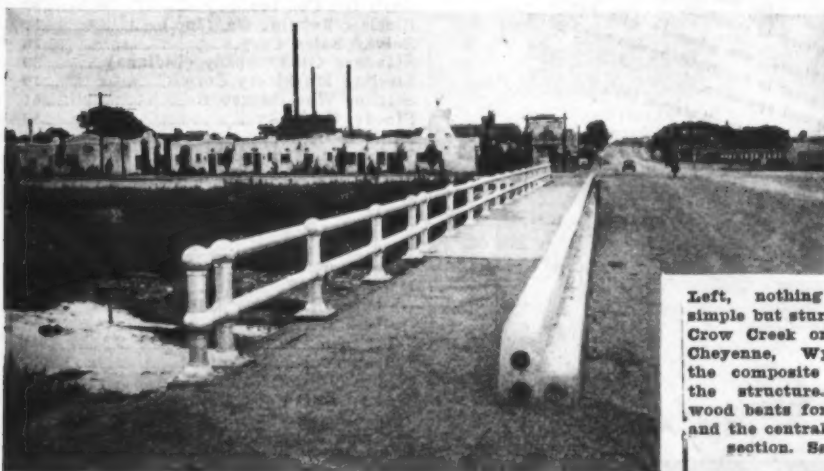


Unsafe practices cost lives. Top, proper shoring of a dump body would have saved a life. Lower photo, hitching rides on railroad cars is inevitably fatal. See page 13.

**Back the Attack**  
**Buy an EXTRA \$100 War Bond**  
**3rd WAR LOAN**



The Minnesota Highway Department uses a one-way truck-mounted plow to clear a circular bridge over the Mississippi River at Hastings. Helpful suggestions for licking the coming snow drifts appear in this issue. See page 1.



Left, nothing about this simple but sturdy bridge over Crow Creek on U. S. 30 at Cheyenne, Wyo., indicates the composite character of the structure. Right, the wood bents for the widening and the central concrete arch section. See page 7.



C. & E. M. Photos